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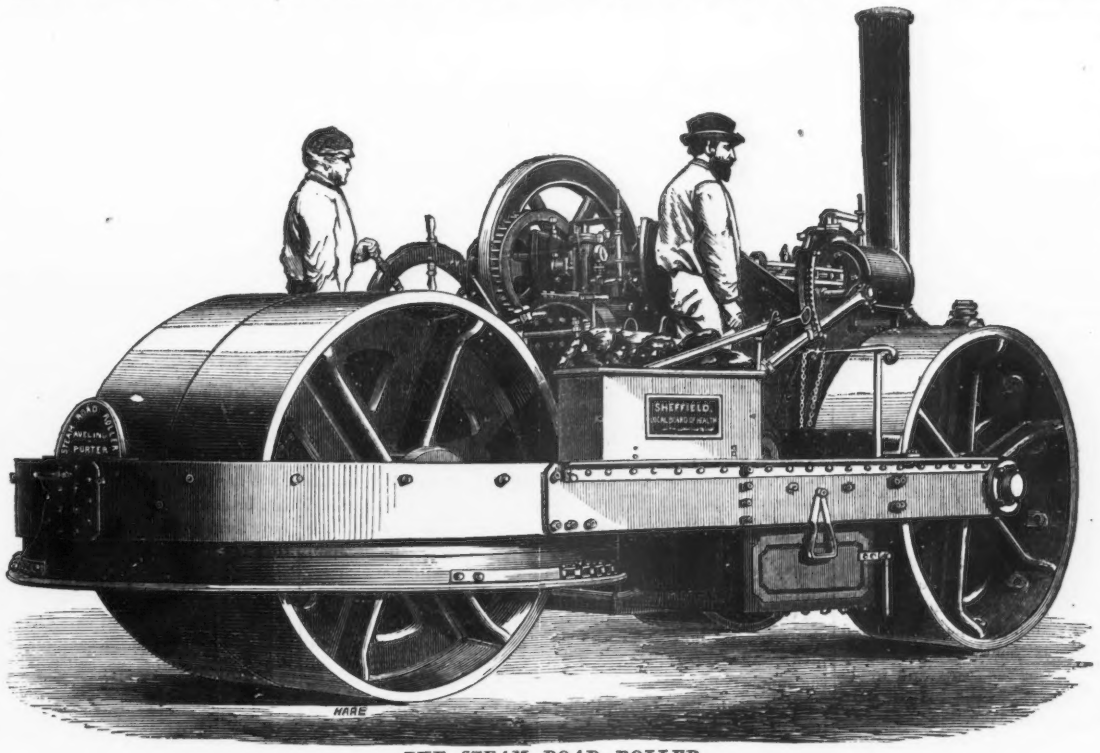
Aveling & Porter's Patent Steam Road Roller.

THE question of steam road rolling has engaged, for the last three or four years, the attention of English engineers and others having charge of the public streets and roadways of the cities and towns throughout Great Britain and France, and wherever the steam roller has been adopted, it is indubitably proved that a very large amount has been saved annually in the cost of street construction and repairs. In many cases, it has been as high as fifty per cent. of the sums paid before the adoption of steam rolling, and there is the highest professional authority for the assertion that when steam road rolling becomes universal throughout the various parishes comprising the London metropolitan district, it will lead to an economy in maintenance of roadways alone of more than £140,000 per annum.

The great success attendant upon rolling roadways with the heavy steam roller, lies in the fact that it consolidates and renders uniformly firm the foundation of the road before the superstructure, or actual wearing part of the pavement, is laid down. It is quite certain that the proper application of the steam roller to the foundation of our streets, before the wooden pavement is put down, would increase its durability twofold. It is the gross neglect of this important particular that hastens the destruction of our wooden pavements. It is not so much to the interest of the road contractor to spend a proper time in consolidating and making good the subway of the road, as it is to get the work done and paid for. So long as the superficial appearance of the pavement is passable, it matters very little to him how soon wear and tear commences, or how soon the roadway is pressed into uneven patches and holes. The sooner this happens, the sooner, also, will the work have to be done over again, and more money spent. To depend upon the usual thin pine plank, laid carelessly upon loose earth, or mud, or sand, and to expect such a pretext for a foundation to keep the road in its proper form and curvature, is most certain to lead to disappointment. The traffic of our city streets is vastly too heavy and constant for such a fragile "foundation" as a one-inch pine plank. Only by an uniform consolidation of the earth forming the roadway upon which the pavement is to be placed, is a good and durable roadway to be secured, and the steam road roller effectually and speedily performs this duty.



THE STEAM ROAD ROLLER.

The accompanying illustration presents a perspective view of the steam road roller patented and manufactured by Messrs. AVELING & PORTER, Rochester, England, who are represented in this country by Mr. W. C. OASTLER, No. 43 Exchange place, New York, who is also the agent for their traction engines and steam ploughs.

This roller is built of four different sizes and weights, namely, fifteen, twenty, twenty-five and thirty tons, rolling six, seven, eight and nine feet wide respectively. The Liverpool roller weighs thirty tons; the Sheffield roller twenty-five tons; and there are several others of these weights in use in England; but the great majority are of fifteen and twenty tons; and, all things considered, the manufacturers themselves recommend the lighter rollers. They are less expensive, and although the effective weight per square inch of rolling surface is not so great, yet this difference is compensated for by passing the roller a few more times over the roadway. The driving-axle is placed under the barrel of the boiler, which is of the multitubular pattern, and the axle of the steering-rolls, is placed in a turn-table under the other end of the foot-plate. The shell of the boiler is butt-jointed, and, together with the fire-box, is made of the best quality of iron, and to a pressure of two hundred pounds per square inch. The engine itself has a single cylinder, placed on the forward part of the boiler, and surrounded by a steam-jacket, at the top of which is placed the stop-valve. Priming is thus prevented, and the use of steam pipes, either inside or outside the boiler, is avoided. The driving-axle is connected with the crank-shaft of the engine by chain gearing of novel construction, and similar gearing is used for transmitting the motion from the steering-wheel to the steering-rolls. One of the rolls on the driving-axle is loose, to enable the machine to be turned on a very short curve. The wear and tear to the roller itself is little or nothing, and the expense of working it is less than one-half that of the horse roller.

We have been favored with an author's copy of a "Report on the Economy of Road Maintenance through Steam Road Rolling, with special reference to London," by FRED. A. PAGET, Esq., C.E. This work, which is now printed by order of the Metropolitan Board of Works, (London), is an elaborate and carefully-compiled document, occupying seventy pages of printed matter.

The subject of road maintenance and construction is one of such magnitude and importance in this country, that we quote largely from this publication, in the belief that many of our readers are much interested in the question:

THE MACADAMIZED ROADS OF LONDON.

Total area of metropolis, 122 square miles and 360 acres. Total expenditures in 1868, on all roads paved and macadamized, £781,003. Total length of all macadamized roads, 1,126 miles; total expenditure per mile per annum, exclusive of cleaning and watering, £250; total annual expenditure for materials and labor on macadamized roads, £280,755.

THE PHYSICAL CAUSES OF THE GREATER DURABILITY OF ROLLED ROADS.

The principal mechanical causes of the great economy produced by road rolling are not very difficult to find. They will be better understood if we examine the states of a rolled and unrolled road respectively. In the first case, there is a solid stone table, consisting of a mass of interlocked stones; in the second, a heap of loose stones, without any mutual cohesion, and, above all, with large intermediate spaces. Herr BOKELBERG, of Hanover, found that, in a cubic foot of broken stone, the intermediate spaces take up about one-half the heap—as the stones get rounded off at the corners the intermediate spaces are much diminished. It results from his experiments that an uncompressed heap of broken stone metalling, contains fifty-three per cent. of mass and forty-seven per cent. of empty space. So that an unrolled road, on being given over to traffic, only consists of, at the most, thirty to forty-five per cent. of stone; while, on the other hand, a well-rolled road covering contains at least from seventy to eighty per cent. of broken stone. At the outset, therefore, the main difference between an unrolled and a rolled road, is that the first contains nearly three times as much empty space as the latter. It is clear that a road cannot be hard and strong until these spaces are filled up. The main causes of the longer duration afforded by the heavy steam roller are, therefore: 1. That it diminishes the actual wear by the traffic. 2. The interlocking of the stones prevents the injurious action—first pointed out by MACADAM—of soft mud and dung, and of the presence of moisture. 3. That it allows both thinner coatings and larger stones to be used.

THE SAVING IN LABOR ATTENDING ROAD ROLLING.

Where roads are repaired without the use of a roller, they are necessarily only metalled in patches here and there, instead of considerable lengths at one and the same time. In the same way, as large areas of loose stones cannot possibly be consolidated *by* the traffic, so is it impossible to lay down great thicknesses of metal for consolidation by the traffic; but the case is quite different when a roller is used. Steam rolling has been found to be most economical where the roads are the most quickly worn away from heavy traffic, and, according to VON KAREN, fifty per cent. are saved by it in wages.

ADVANTAGES OF STEAM ROLLING OVER HORSE ROLLING.

The steam roller produces no interruption of the traffic from time taken up in turning the machine, nor from slow progress of the rolling on accout of light weight. The steam road roller can completely consolidate from 2,000 to 2,400 square yards in a day of ten hours. It can be rapidly turned, and may be made of almost any weight endurable by a road; while its smoothing action from this extra weight, and its possession of a motive power not requiring the metalling for fulcra, as do the horses' hoofs, is much superior. AVELING & PORTER'S steam roller can go up inclines of one in twelve with ease. Mr. MANN, the Superintendent of the Department of Her Majesty's Commissioners of Works, is of opinion that the steam roller has "the effect of turning down the sharp edges of the stones, and leaving their flat sides uppermost, bedding the stones together in the road so as to make a solid level surface."

ECONOMY IN ROAD MAINTENANCE PRODUCED BY STEAM ROLLING.

The results obtained on the numerous steam rolled roads of Paris, for more than seven years, have led to the general belief that, with the same expenditure, a road rolled by steam lasts double the time of that rolled by horses. Mr. HEATON, the Birmingham Surveyor, calculates that an annual saving of £5,700 to that town will be effected by the use of the steam roller. Mr. NEWLAND, the Liverpool Borough Engineer, writes with regard to AVELING'S thirty-ton roller: "Our roads are in much better order, and easier kept clean, than before its use, and our bills for macadam are not so heavy." Mr. HOLMES, the Sheffield Surveyor, who is using a twenty-five ton AVELING roller, says: "I have no doubt the steam roller will increase the saving at least forty per cent. over unrolled roads." Mr. BUCKHAM, the Maidstone Surveyor, writes that the "results obtained from using the roller are economy, durability, comfort, and uniformity of section of road." Mr. HOWELL, Surveyor of Roads in St. James' District, says: "The stones being forced into a soft bed, will not be fritted away as they would be when exposed to horses' hoofs and wheels;" and considers "that the use of a heavy steam roller ought to reduce the cost of maintaining roads from one-third to one-half, and give a better road." He says that two-thirds of the material are saved. The Parisian engineers have found that the saving in steam rolling roads has reduced the cost of maintenance one-half. We must remember that, before the introduction of the steam roller, the use of horse rollers, combined with the method of covering large lengths of road with fresh metalling, was practiced. The result is, that they have at once a basis of comparison, enlarged by the use for years of their steam rollers. Thus, roads they had to roll by steam once every six months, have been, layer upon layer, so much improved by the operation, that they now have only to be rolled once a year.

THE APPLICATION OF THE STEAM ROLLER TO THE FORMATION OF THE FOUNDATIONS OF NEW ROADS.

France.—Except with very heavy traffic, or with a very soft

substratum of the road, the French engineers do not use paved, and very seldom concrete foundations or bottoming. They compress the bottom by rolling, and then roll down upon it successive layers of road material, about four inches thick.

Liverpool.—The thirty ton steam roller of AVELING has been in use more than two years and a half. Mr. HOLMES writes, that "besides its advantages in making a newly coated macadam road perfectly smooth *in a single night*, it is of no less utility in forming *the foundations* of new roads. Formerly the *traffic* had to be turned on these foundations to consolidate and render them fit to receive the protective coatings of paving or macadam respectively—a work which took from three to six months, according to the locality. Now, when the foundation is laid, it can be rendered fit for paving and macadam in a day or two. There are upwards of forty miles of macadamized road in Liverpool.

SUBSIDIARY APPLICATIONS OF THE STEAM ROLLER.

Paved Streets.—In Paris, successful but partial experiments have been made with the steam road roller as a substitute for the pavior's rammer. In Hanover, the heavy roller is much used on the finished paved road, and effectually destroys the unevenness otherwise prevalent. It is clear that steam rolling must be peculiarly applicable to the construction of foundations for paving streets.

Picking up Roads by Steam.—This machine has already made itself useful in a variety of ways, and adapted itself to several important functions in road making and repairing, besides that of rolling only. With respect to picking up, or "lifting," the macadam of old roads, before laying down the fresh coating of metal, there can be no doubt that a great economy of manual labor can be effected. At Manchester, one of AVELING & PORTER'S rollers, with its picking apparatus, picked up an area of 2,048 square yards in three hours and forty minutes; and the cross-picking, afterwards done by hand labor, was *only equal to that of one man working sixty hours.*

Breaking and Conveying Metal.—It is obvious that the steam road roller could be easily applied, not only to driving stone-breaking machines, but also to conveying the metalling to the spot where it is required.

Sea Coast Defences.

GENERALS BARNARD, CULLOM, TOWER, and WRIGHT, of the United States Engineer Corps, reported to General HUMPHREYS, Chief of that Corps, as follows, under date of April 10, 1869:

EXPERIMENTAL CASEMATE SHIELD AT FORT MONROE.

This target represented a casemate of masonry, in which the entire scarp end of the casemate was closed by an iron shield, through which the embrasure opening was made. The prominent objects kept in view in this design were twofold:

I. To determine by experiment whether masonry in masses of considerable depth and thickness might not yet be used in connection with iron for new constructions, so as thereby to reduce the iron work to a mere shield in front of the gun.

II. To test a particular form of shield designed by special reference to the arrangement in question.

The excessive cost of even a single casemate, in which the whole scarp front shall be of iron, will sufficiently explain the motive which influenced the desire to combine, if practicable, a less costly material with iron.

The iron shield itself was simple in design, consisting mainly of two cheek-plates twelve feet long, four feet wide, and one foot thick, each resting against two iron posts fourteen feet long, one foot wide, and fifteen inches thick, inserted into the arch above and the masonry floor below.

The granite pier was struck by four fifteen-inch iron or steel shots of four hundred and fifty to four hundred and eighty-five pounds each, fired at a simulated range of five hundred yards, which did not seriously impair the stability of the pier, though its front was much damaged. This was doubtless in part owing to its projection from the general face of the scarp, and to its being without load, and having, therefore, little support from the continuity of structure or superincumbent weight. The left pier, built for economy, of concrete, faced with brick, failed to give satisfactory resistance. Only one of the four shots—that aimed obliquely at the junction of the iron with the pier—produced injurious or even visible effects on the interior surfaces. That one threw off dangerous fragments from the granite immediately behind the point of impact of the shot.

The shield was struck by six shots, generally hitting about the middle of the width of the plates, five of them being the most powerful in energy that can be delivered by modern artillery, at ranges of one hundred and fifty and five hundred yards, one of which, indeed, fired by the fifteen-inch gun, with one hundred pounds of powder, and a *steel* shot weighing four hundred and eighty pounds, at one hundred and fifty yards, was probably the maximum blow, estimated in foot-pounds, ever delivered upon a target. Though the shield was fractured and its supporting-posts broken by these powerful shocks, every shot was stopped by it.

The posts of forged iron, though very massive, broke so readily as to indicate that such supports are inadmissable. Had the same amount of iron been applied in the form of built beams or backing-plates, it is probable that the vertical supports would have afforded better results. The bearing surface of these posts was also insufficient, and the lack of some more elastic material, to receive the shock upon them, was very apparent; besides, they had but nine feet, instead of the whole length of the casemate arch, for their support. This small piece of arch was finally thrown down by the tenth and eleventh shots, the fifth and sixth upon the iron. The fractures and broken surfaces of the posts and plates seemed to indicate undue brittleness, and it is probable that a softer and more ductile iron would have given better results.

In conclusion, it may be stated, in reference to the main object of the experiment, which was to test the practicability of combining iron and granite, that the results show that the objections to such a combination, and the difficulties in the way of overcoming them, are very great. It is to be regretted that a means of supporting the shield proved by the results to be so inadmissible—the forged standards or posts—should have made the experiment less decisive of the question to be solved than it otherwise would have been. The granite, *as a mass*, stood very well, and the Fort Delaware firings were even more satisfactory in that respect. No fragments were thrown *through* the embrasures from the external surface, but the experiment affords no conclusions on this point for the case of oblique fire on the same pier from the other direction. It seems likely that some preventive of this would be necessary, and it is pretty certain that the same would be required for the arch over the front of the embrasure. The junction of the shield and pier is another weak and dangerous point of the combination, imperatively demanding correction. These faults are serious, and the means of overcoming them not exactly obvious. Economy is the motive for resorting to such a construction, and, considering the enormous cost of iron for these structures, it is a very powerful motive. If it should appear that the cost of remedying the palpable defects of a combination carries the total expense to an equality with that of a pure iron structure, the motive of economy would, of course, no longer exist. Yet, after the protracted experiments in Europe, in iron alone, no construction has yet been arrived at, which the Board could recommend for adoption, and the combination of iron with granite, or with some substance for granite, seems yet a legitimate path of experiment. In another place, it will be seen that the Board recommends experiments with cast-iron and cast-iron concrete as a substitute in the front portions of the piers.

CASEMATE SHIELD AT FORT DELAWARE.

These experiments were undertaken to test by actual trial a proposed modification of the casemates of the best of our sea-coast works. This modification consisted in the removal of the masonry surrounding the present embrasure, so as to afford an opening through which the gun could fire with the usual lateral traverse and elevation and depression, and placing an iron shield *behind* this opening, which should cover the entire scarp ends of the casement, and be so supported in rear as to have no point of attachment to either scarp or piers. The casemate, so modified, admitted the use of a ten-inch rifled or thirteen-inch smooth-bore gun, the largest which could be introduced without a material sacrifice of horizontal traverse.

The more important results of the firings may be stated as follows:

I. That the masonry afforded a resistance sufficient to show that, so far as it was concerned, the proposed arrangement was not inadmissible as a means of modifying existing casemate works. This resistance exceeded that in the experiments at Fort Monroe, the difference being, probably, due in part to the fact that the masonry in Fort Delaware was an integral part, instead of a fraction of a massive structure, and in part to the stones being *small* and the mortar thoroughly indurated.

II. That the various parts of the shield were generally too light to withstand the destructive effect of the powerful projectiles to which it was subjected.

III. That the horizontal joint in the rear plates, at the middle of the cheeks of the embrasure, presented a weakness in the combination which rendered it impossible of withstanding the powerful blows to which it was exposed, particularly when the impact was directly over the joint, and near the edge of the embrasure opening. This joint cannot be avoided in a shield of only two thicknesses, owing to the impossibility of rolling plates of adequate width, but the weakness consequent upon it may be remedied by using another thickness, otherwise required, to give the requisite strength to the shield.

IV. That the bracing supporting the shield must not only be stronger, but must be better secured to the shield and bed-plates. This, it is believed, may be done, or the character of the supports may be altered, if thought best.

V. The thin skin of iron lining the sides and top of the opening through the scarp served fully the purposes for which it was introduced; but it may well be thought that it will be worth while, in case it should be determined to introduce this modification into our works, to incur the further cost of increasing the thickness of this lining, in order to give greater stability to the surrounding masonry, and to guard against fragments being carried by oblique shots through the embrasure into the gun-room.

VI. The iron of the plates was noticeably hard and brittle, and the laminæ indicated imperfect welding. In these respects the plates seemed inferior to those in the Fort Monroe shield, instead of better, as had been expected. A softer and tougher iron would, undoubtedly, have given better results.

On the whole, the results of the experiments upon this target were so far favorable as to justify, in the opinion of the Board, further development and test of the plan. Any preliminary tests may be made of the shield and its supports distinct from its masonry connections, thereby avoiding the cost of fitting it to the casemate.

It may be remarked, in connection with this project for modifying our existing works, that the adoption of heavier guns will render a less number necessary for the defence of any given point, and that it would be sufficient, probably, to use every other casemate; in which event the intermediate ones would be available for various purposes—the scarps of these being strengthened to any desired extent by adding to the interior, which would also give greater mass to the piers adjacent to the scarp, which are weak points of our present casemated structures. These intermediate casemates would also afford convenient *wells* for the counterweights of depressing barbette carriages, should any device of the kind be found by experiment to meet our wants.

GENERAL CONCLUSIONS.

The results exhibited by these experiments do not enable the Board to recommend any plan of construction for casemates or shields for sea-coast or harbor defence batteries. The inadequacy of methods of construction hitherto used is fully proved, but the proper or best substitute for them is not clearly indicated. It has been hitherto assumed, rather than demonstrated, that iron is the true substitute for masonry. A resort to it may be compulsory in some cases, but it will not do to embark upon extensive construction in that material upon assumption, nor to ignore the probability, in this era of change in the instruments of warfare, of wasting the treasures of the nation upon structures which may be as unfit to resist the means of attack of a future year as those works, completed on the highest principles of art then known, in 1859, are of resisting the artillery of the present day. One of the very highest authorities, the veteran field-marshal, Sir JOHN BURGOYNE, until quite recently at the head of the English Royal Engineers, remarks, in commenting upon the Gibraltar shields, "how rapidly the increasing power of the new artillery creates the necessity for additional resisting power, both on shore and afloat. That which may afford adequate protection one day, may be insufficient to resist the powers of the artillery that may be in existence when the shield is produced on completion of the contract." Still more recent experiments in England, upon the "Plymouth" shield, upon the "Midwall," the "Chalmers," and other experimental constructions, only add to the force of these words, and show that, thus far, the destructive power of guns, both by increase of calibre and improvement in projectiles, more than keeps pace with protective invention.

Nor, if we look to the experience of yet other nations, do we find anything more satisfactory. The Russians appear to have gone *practically* into iron construction more extensively than any other nation, but this Board has no ground to believe that the constructions employed are superior to the English designs just alluded to.

Of what has been done, or is being done, in other European nations, we have but meagre information. When it is borne in mind that an European war has been a probable contingency at any moment in the last two or three years; that equally with Russia and England, France, Austria, and Italy have, in the shape of great commercial ports and naval depots, objects of vital interest to hold against naval attack, we cannot infer, because we find no published facts to the contrary, that these nations have been inert, or have neglected any practical and well-founded measure of precaution and safety. If, therefore, it shall appear that little has been done or established with them concerning iron construction, it will be a confirmation of the opinion advanced by the Board, that no satisfactory results have been arrived at upon which it could be based.

We have stated that the results thus far attained "do not enable the Board to recommend any plan of construction for casemates or shields for sea-coast or harbor-defence batteries;" yet, if the problem is limited to resist such guns as were used in the experiments, or such as were used by the English against the Plymouth and Millwall shields, it is not to be inferred that such a construction, though necessarily costly, is considered unattainable. It is almost beyond the range of possibility that, in a real engagement with a fleet, the shields or casemates of the fort should be so severely tested as were the casemate shield at Fort Monroe, and the casemate at Fort Delaware, or the English "Plymouth" and "Millwall" shields; and, indeed, it is quite probable that guns protected by those constructions might have done good service. However that may be, none of them can be considered as fulfilling all conditions, or as being the best forms for such structures, to arrive at which we need further experiments, and investigation on many points:

I. Improvement in the quality and manufacture of iron plates, and determining what qualities and combinations of metal are best adapted to the purpose. Some foreign plates should be procured for comparison, and test plates from American manufacturers be called for. Incidental to this is the analysis of the irons used in the shields just tried, and perhaps other irons.

II. Experiments upon cast-iron, or cast-iron concrete, or both, as a material for piers, or parts of fronts remote from the embrasures. It is understood that the latter material is being manufactured by KRUPP, for Prussian fortifications.

III. It is desirable to ascertain by experiment whether a concrete of lead may not be applied to the face of a shield, in order to take up the greater part of the living force of the projectile; whether the same material or simple bars of lead may not advantageously be inserted *between* front plates to the same end.

IV. It is important to know the exact state of iron construction in Europe at the present date, not only with regard to experimental results, (of which we are pretty well informed), but as to its actual application to sea-coast batteries. This kind of information can hardly be obtained without personal investigation by one or more engineer officers.

In the foregoing, no reference has been made to the possibility or probability that a much more powerful ordnance than any yet used may be arrayed against shore batteries. We know that some of our own turreted iron-clads—the "Kalamazoo," for instance—are designed to carry twenty-inch guns. The fifty-ton steel rifled gun of KRUPP is rated as yet more powerful, its powder charge being, as stated, from one hundred and ten to one hundred and thirty pounds, and its solid steel shot weighing one thousand two hundred and twelve pounds. In the experiments and investigations suggested, the problem to make constructions capable of facing such ordnance must be kept in view.

In thus postponing the application of iron construction upon our works of harbor defence, the Board feels called upon to point out in what direction progress should be made in providing for the defence of our harbors:

I. By the arranging, whenever the site will permit, of cheaply constructed barbette batteries, without breast-height walls, and with wooden platforms for the guns. Such a battery may

readily be modified hereafter, so as to adapt it to the use of a depressing (or counterpoise) carriage, and should, unless on a very elevated site, be planned with this view.

II. The substitution for the barbette carriage of one which will admit of the depression of the gun below the crest of the parapet for loading. Earth is the cheapest and best of all materials to stop shot. But the common system of barbette mounting—that is, so as to fire over an earthen parapet, which was pretty sure to fail under the old system of things whenever the batteries were low and could be closely approached—is, under the same, or even much more favorable circumstances, almost inadmissible for the enormous guns of the present day, in consequence of their unavoidable exposure of the connonier during the laborious process of loading. The English are understood to have adopted the Moncrieff carriage, a device of great merit. A working model of a carriage on identically the same principles, invented by the late Brevet Brigadier General DE RUSSY, many years ago, is now in possession of the Engineer Bureau. Under this and other forms, this subject is being now studied, and in the achieving of a practical result, we see a way opened most clearly to attaining an efficient service of modern sea-coast artillery, where the proper sites present themselves

III. The development of a system of defence by mortars of large calibre. To prevent the occupation *as an anchorage* of a roadstead, there is nothing more effectual than the mortar. It is believed, though never yet extensively introduced for that purpose, that it may be made an efficient agent of defence, against iron-clads, of the channels of approach to our cities and ports, and if so, its emplacement involves none of the embarrassing questions of iron construction. It is well known that there are no projectiles of which sailors have greater dread than those from mortars, and that the invulnerability of *side* of an armored vessel can be but very imperfectly extended to her deck. On the other hand, the difficulty of hitting by vertical fire an object of as small an area as the deck of a vessel is conceded. But when it is understood that considerable accuracy of mortar fire can be attained against stationary objects, such as vessels in position or arrested temporarily by obstructions, at distances not exceeding the width of most ship channels, and that the increased *effect* of successful shot will in some degree compensate for inferior accuracy, as compared with the gun, the mortar will readily be accepted as one of the most efficient means of defence against the modern means of attack.

IV. Defence by torpedoes. Although devices to be classified with what are now called, generically, "torpedoes," have been long known, it cannot be said that their use took any practical shape until the Crimean war, when the Russians, with no very noticeable results, introduced them into the defence of several of their ports on the Baltic. It was the sharp spur of necessity which drove the South, in our civil war, to every imaginable expedient to neutralize the maritime superiority of the United States, which so greatly developed their use and showed the importance of the new defensive agent.

The Secretary of the Navy uses, in regard to them, the following significant language :

"The only vessels lost by the United States government in both these attacks," (*i. e.* in the defences of Mobile Bay, Alabama, and at Fort Fisher, North Carolina) "and the shore batteries of the Confederates were splendidly served, were destroyed by *electric torpedoes*, which, always formidable in harbors and internal waters, have proved *more* destructive to our naval vessels than *all other means combined*."

The destruction of two ocean and two river monitors, (the "Tecumseh," the "Patapsco," the "Milwaukee," the "Osage,") the iron-clads "Cairo" and "Cincinnati," the tin-clad "Rodolph," the sloop of war "Housatonic," besides several gunboats and transports,* are the striking facts which authorize the Secretary's strong expressions, as also the moral effect which their real or supposed existence uniformly had upon our attacking squadrons. We are now thoroughly acquainted with the Confederate inventions ; but European nations have taken up the matter where they left off. Colonel JERVAIS (royal engineers) says, in a lecture on "coast defence," before the Royal United Service Institution :

"The labors of a committee lately appointed have been crowned with perfect success, and both naval officers and engineers are now passing through courses of *torpedo* instruction." * * *

And again :

"We are now in a position to apply this system of defence to any extent that may be required for the protection of our harbors and other points upon our coasts."

We find it also stated in the *Army and Navy Gazette* :

"Further experiments have been made at Toulon with torpedoes, and it has been decided, in case of war, that that port shall be strongly defended by these submarine monsters. The Government, however, thinks that the torpedo subject is one which should be confided to a special corps, and hence a school is to be established at the Isle of Aix, where the mysteries of these engines of destruction will be taught."

The Austrian government we know employed torpedoes in 1866 for the defence of Venice, Pola, and other maritime and naval depots in the Adriatic, and has made important advances in their construction and use.

Far less expensive than any other accessary to harbor defence, none can be so promptly improvised, provided an expert body of men is available to apply and manage them ; and though but an accessary to shore batteries, which protect them, they are perhaps quite as formidable an opponent to a hostile fleet as even the battery itself. The board suggests that the engineer battalion is the most fit agent for experimentally developing the system, and to furnish the "personnel" to apply it to actual defence, and it recommends that this duty be, under the direction of the board, assigned to it, its commanding officer becoming *ex officio* a member whenever this subject is on hand.

V. Obstructions. The first Board of Engineers, by which our existing system of sea-coast and harbor defence was originally devised, admitted, even at that early day, (1816) when wooden sailing ships were agents of naval attack, the necessity, in certain cases, of "obstructions." In a report of the board of 1840, just subsequent to the earliest successful applications of steam to ocean navigation, the following language is used with regard to them :

"If, after having occupied the shore, in the narrow places in the best manner with batteries, we are of opinion that the temptation may induce the enemy, notwithstanding, to run the gauntlet, the obstruction of the channel must be resorted to. By this is not meant the permanent obstruction of the passage ; such a resort, besides the great expense, might entail the ruin of the channel. The obstruction is meant to be the temporary closing by heavy floating masses."

The temptation to run the gauntlet, which a particularly fair wind and tide might offer to a fleet of sailing vessels, would be very slight, indeed, to that offered by the possession of a mortar independent of wind and tide. It was the recent application of steam to vessels of war which thus brought up the subject so prominently before the board of 1840. But in this connection the change from wind to steam as a motor was scarcely more important than that from wood to iron as a material of construction. Though steam would carry with equal speed the unarmored and the armored vessel past shore batteries, the latter, comparatively *invulnerable*, need pay little heed to missiles which would cripple or destroy a wooden ship. Accordingly we find the necessity of some means of preventing this "running the gauntlet," whether by obstructions or torpedoes, or both, to be now universally admitted.

When during the civil war there was apprehension of foreign interference, the greatest solicitude was felt for the security of our great seaports under such a contingency. A commission of eminent civil engineers and others was appointed by the Governor of the State of New York, in 1862, "to devise and report a plan for obstructing the passage of an enemy's ships of war into the harbor of New York through the Narrows." The plan thus devised would doubtless be an effectual barrier, but it was one which, very costly, would require many months to construct. The tendency of modern warfare is to become sudden, sharp and brief, and an obstruction, to fulfill its intention, must, like guns and forts, be prepared beforehand for application at the moment of emergency, or it must be susceptible of *improvisation* from materials everywhere accessible.

The engineer officer in charge of the defences of Washington in 1863, fully impressed with the importance of devising a channel obstruction which should fulfill the conditions, as well as of having a means of closing the approaches to Washington by the Potomac, against iron-clads, obtained, through the recommendation of the Secretary of War, an appropriation of $300,000 for "floating obstructions" for the Potomac. Before attempting an application of this fund to actual construction, a new and thorough study of the subject was undertaken. The suggestions of former boards of engineers, and the plans of the New York commission, and many others, (particularly a very meritorious and original one of Mr. W. P. TROWBRIDGE, formerly of the Corps of Engineers) were consulted, and the subject was finally committed to Lieutenant Colonel (now Brevet Brigadier General) B. S. ALEXANDER, of the Engineers. The result of his studies, prolonged through nearly two years, was the development of a plan which was recommended by a board of engineers for experimental trial, and a section has accordingly been constructed, under the directions of the Chief of Engineers, to be submitted to trial in the Potomac river. In this plan, which has many peculiar features, a very minimum of timber necessary for flotation is employed, which, as also the iron-work, can be prepared and stored ready for emergency.

VI. Floating batteries or harbor defence vessels. The issue raised as to the employment of shore batteries or floating batteries has been so ably met in reports of former boards of engineers, that nothing further would need be said if that issue remained unchanged. In that case the proposition that floating batteries, of all defensive arrangements the most costly to prepare, the most expensive to maintain, and withal exceedingly perishable, are not needed where the waters to be defended can be thoroughly swept by shore batteries, would be as true now as it was twenty-five years ago. But we cannot assert that the issue remains unchanged. All now admit that shore batteries cannot alone certainly prevent the passage of hostile vessels which accept the risks of "running the gauntlet," and all equally admit that a well-devised armored "floating battery," combining the powers of the battery and the "ram," may be a very valuable accessory. A half dozen light draught "rams," invulnerable to artillery fire, stationed on the shoals of the east and west banks, would be in themselves exceedingly formidable to the hostile fleet, which, to approach New York, must extend itself in single or double file to make its way up from Sandy Hook through the Narrows. They would be equally or more formidable to the same fleet assembled in the lower bay, while making preparations for an attack. The arguments for the relative claims of shore and floating batteries cannot, therefore, be considered the same as they were a few years ago, and it may be necessary to a good defence to have their aid in all our important harbors. What is the best form of such structures and the extent to which they should be employed, are subjects which, though old in themselves, have become new, inasmuch as all the conditions are new. It does not seem to be within the sphere of the board to take up the questions involved in all their extent, but they have thought it proper to present the subject in its proper aspects.

VII. It need scarcely be added that shore batteries, however perfectly constructed, are of no avail against their iron-clad antagonists, unless armed with the most powerful artillery. The Corps of Engineers has ever insisted upon the paramount importance of large calibers for its batteries. The fifteen-inch smooth bore, the first successful step towards the modern increase of calibres, may be claimed as the result of the zealous labors of the Ordnance Department to meet the demands of the engineers : and the twenty-inch gun was but another step taken expressly to provide an almost irresistible weapon for harbor defence. It is stated that the Prussians are employing the fifty-ton gun of KRUPP (an equivalent to our twenty-inch gun) for the defence of the port of Kiel, and the desirableness of guns of such power for the defence of the great ports and harbors is indisputable. It is not the province of the Board to indicate what particular kind of gun is to be preferred, but it feels called upon to note the necessity for their provision as the first and most indisputable element of harbor defence.

In presenting its report on the recent experimental firings, the board has thought it necessary to give in the foregoing a review of the means and requirements for coast defence as they now exist, or as they may be developed, and to indicate the path in which progress may most rapidly be made.

While recommending a continued study and renewed experiments in iron construction, the board indulges a hope that through the defensive means just enumerated, fully developed, the construction of forts or batteries in a material so excessively expensive, and as yet so unsatisfactory, may be in a great degree avoided.

General SHERMAN endorses this report as follows :

While the size of heavy guns is being daily increased, I do not deem it advisable to depend for protection against them on iron shields that, strong enough to-day, may be useless to-morrow.

For the defence of a channel or harbor against naval attempts, our guns should be of the largest calibre, and scattered in earthen barbette batteries, with heavy intervening traverses, so as to avoid concentration of fire on them, and to protect the gunners.

These batteries should be protected against land attacks by one or more central works, affording cover for all the necessary material and supplies, having masonry scarps or counterscarps, these scarps being entirely covered from exterior fire by a glacis.

We should make as much use of torpedoes as the rebels did during the late war, and mortars should be freely used for moral as well as real effect, wherever an attack from iron-clads is to be feared.

As there will be some points needing defence, but without room enough for earthen barbette batteries, the Board should continue its studies of iron, proposing projects for further experiments whenever it deems them necessary.

The recommendations of the Chief Engineer are approved.

OFFICE OF THE CHIEF OF ENGINEERS, WASHINGTON, May 11, 1869.

GENERAL : I have carefully considered the views and suggestions by the board in its general report of the 10th of April, 1869, upon the experimental firings at Fort Monroe and Fort Delaware. The conclusions reached are, generally, in accordance with my own views, and, I suppose, with those of most intelligent officers who have studied the questions involved.

The first conclusion of this board, viz : postponing the application of iron constructions upon our harbor defences, seems to be unavoidable. We have not yet the means nor the knowledge, in this country, for the successful and economical application of this material ; and we can make important progress on our defences independently of the use of iron, without further prolonged delay, and with moderate expenditure.

The board will therefore enter at once upon the consideration of the several branches of defence proposed in the report, and devise projects for their application to the great harbors of New York, Philadelphia, and Boston.

1. Sites should be designated and plans matured for barbette batteries of such character and extent as may be considered important for a better defence of the three places named.

2. The introduction into the barbettes of barbette carriages admitting the lowering of the gun behind the parapet for loading. Such information as has been collected here on this subject will be sent to the board as soon as possible, in order to aid in an early and practical solution of this question.

3. The introduction of mortars as a special element in coast defence; the importance of which has been materially increased by the application of heavy iron armor to the sides of ships.

The determination of positions and preparation of projects for mortar defences for the three great harbors named, and their approaches, should receive the early attention of the board. Designs for mortar platforms for sea-coast use have lately been prepared at Fort Monroe by the engineer and ordnance officers jointly. Drawings of the models adopted will be supplied to the board without delay.

4. Torpedo defence. Projects for the application of this accessory to the defences of the three harbors named will be prepared by the board. It is believed that sufficient information on the subject has been accumulated to admit of the presentation, in a practical working form, of this means of defence, at least so far as the materiai is concerned. The suggestion of the board that the engineer battalion be instructed in the method of using a torpedo system is regarded as appropriate ; and upon your call the officer commanding the battalion will be associated with the board in its consideration of the maneuvre and drill of torpedoes, as well as in the preparation of projects for the material.

5. Obstructions. A trial of the experimental section of timber obstructions now stored near Washington is contemplated

* Twenty-four United States vessels, in all, were *destroyed*, and nine others badly damaged. In the beginning, the use of torpedoes was a novelty little understood, but the rapidity with which its formidable character developed itself, is shown by the statement that while during the year 1862 the Confederates destroyed but a single United States vessel, they destroyed no less than *eleven* the last four months of the war.

whenever the requisite arrangements with the Navy Department can be made.

6. Floating batteries. When the board shall have made such progress with the several projects herein referred to as to be ready to say in what cases they regard floating batteries or rams as important auxiliaries to the defence, and to specify the particulars of position, size, quantity, and character of ordnance and offensive power, etc., for the floating batteries, it will become proper to advise with the navy respecting the provisions of such vessels as will fulfill the condition of the required service.

7. Ordnance. A formal statement of such ordnance as is required for a satisfactory defence of the harbors now under consideration, its kinds, calibres, and numbers, beyond what is now present in them, should be supplied by the board as soon as its determinations will admit of the requisite specifications. A partial statement, also, in anticipation of the final one, is desirable.

In view of the difficulties which have manifested themselves respecting the adaptation of iron to land defences, its great cost, the unsatisfactory results of trials in other countries as well as in this, the want of establishments competent to its preparation for our use, and the undeveloped condition, commercially and mechanically, of the iron industry with us, it does not seem expedient to enter for the present into examinations and experiments on a large scale respecting this material, though inexpensive researches and trials should be undertaken.

Cast iron, iron conglomerate (the Ellahausen patent), and lead concrete are materials the use of which should be considered by the board. Such information as has been obtained here respecting the two last will be supplied as soon as practicable, so that if any of these promise to be valuable for our purposes, their availability may continue under consideration while approved materials and methods are being applied without further delay.

Of course, the order in which the several ports specified herein, and also the order in which the several defensive elements discussed are named, have no reference to the treatment in point of time, of the parts of the subject by the board. That will be determined by the facility and promptness with which the various particulars can be disposed of in their deliberations.

Each matured project presented by the board should be accompanied by a detailed estimate of the cost of its execution.

Materials on hand not needed for further use should be sold, with the view of reducing expenditures as much as possible.

As the defences of each position come before the board, the engineer officer in immediate charge will be notified by you to be present as a member for the time.

Very respectfully, your obedient servant,

A. A. HUMPHREYS,
Brigadier General and Chief of Engineers.

Brevet Major General J. G. BARNARD, U. S. A.,
President Board of Engineers for Fortifications, New York City.

Inter-Oceanic Canal Across the Isthmus of Panama.

A paper read before the American Society of Civil Engineers, by JOHN C. CAMPBELL, Civil Engineer.

HAVING spent three years upon the Isthmus of Panama, in the location and construction of the Panama railroad, I have long been of the opinion that a favorable route for a ship canal existed near the line of that road, and that the facilities that would be furnished by the railroad during the construction of the canal, would be fully equal to what the railroad company might deem the value of the right to allow such construction. I have obtained the accompanying estimate from Colonel TOTTEN, Chief Engineer of the Panama railroad, and in this estimate I most fully concur.

In 1845-50 Colonel TOTTEN built a canal from the Magdalena river to Carthagena. On the completion of this work he took charge of the construction of the Panama railroad, and is still in charge of that very successful work. His attention has been directed to the finding of the most feasible route for a ship canal across the Isthmus, and after examination of the different routes proposed, he is satisfied that the line crossing near the Panama railroad is the most feasible one, and has furnished me with the accompanying estimate of cost, as the result of his judgment, formed from the experience of years in the construction of public works in that region.

The distance across the Isthmus in a direct line, between Lemon and Panama bays, is thirty-three miles, and the estimate is for a canal between those bays. The proposed route, starting from Lemon or Navy bay, at the mouth of the Rio Minde, crosses to the Chagres river at Gatun, three miles distant; thence following the Chagres river to the mouth of the Rio Obispo, two miles above Gorgona; thence cutting through the summit ridge (which is two hundred and eighty-six feet above tide-water) to the Rio Grande; thence down that river to its mouth, entering the Pacific Ocean about two miles from Panama.

Mr. NAPOLEON GARELLA, in March, 1846, measured the flow of the Chagres river, and found it to be 686 1-2 cubic feet per second, and the velocity 20.08 inches per second. The month of March is the last of the dry season, the rains commencing in the mountains in April. In 1828-29 Colonel LLOYD made a survey across, from Porto Bello to Panama, crossing the Chagres river 24½ miles above Gorgona. He found the elevation of the river at that point 171 72-100 feet above tide-water, being 130 72-100 feet above the river at Gorgona, which is 41 feet above the mean tide of the Atlantic.

The estimate is based upon constructing a canal that will carry the largest class of vessels, with an intermediate set of gates in the locks, to be used for the smaller vessels.

PROPOSED DIMENSIONS.—Canal to be 150 feet wide at bottom, with side slopes of one and one-half horizontal to one vertical in earth, and one-half to one in rock. Depth of water to be thirty feet; locks to be 90 feet wide by 500 feet long.

Estimate for canal with summit 135 feet above mean tide-level:

Earth excavation, 12,000,000 cubic yards, at $1.	$12,000,000
Rock excavation, 6,000,000 cubic yards, at $4.	24,000,000
Embankment, 13,600,000 cubic yards, at $1.	13,600,000
Twenty-two locks, at $700,000 each	15,400,000
Dam across the Chagres river, at the mouth of the Obispo	1,000,000
Feeder twenty-two miles, and dams above	2,000,000
Extension of canal in Panama bay	3,300,000
Extension in Navy bay and breakwater	1,800,000
Aqueducts and culverts	2,500,000
Protection walls	110,000
Total	$75,710,000

Estimate for a canal with a summit 45 feet above mean tide-level, which is the level of the Chagres river at the mouth of the Rio Obispo:

Earth excavation, 24,500,000 cubic yards, at $1.	$24,5' 0,000
Rock excavation, 26,200,000 cubic yards, at $4.	104,800,000
Embankment, 13,600,000 cubic yards, at $1.	13,600.000
Ten locks, at $700,000 each	7,900,000
Dam across the Chagres river, at the mouth of the Obispo	1,000,000
Works in Panama and Navy bays	5,100,000
Aqueducts, culverts, and protection walls	2,610,000
Total	$158,610,000

Estimate for a thorough cut. Canal to be 30 feet below mean tide level, with a tunnel 2¾ miles long, through the summit ridge, 150 feet wide by 180 feet total height, or 150 feet above the level of top water:

Earth excavation, 92,000,000 cubic yards, at $1.	$92,000,000
Rock excavation, 40,000,0 0 cubic yards, at $4.	160,000,000
Tunnel, 13,000,000 cubic yards, at $8	104,000,000
Harbor works	8,000,000
Total	$364,000,000

TIDES AT NAVY AND PANAMA BAYS.

Average rise and fall of tide on Atlantic	1.16 ft.
Average rise and fall of tide on Pacific	13.00 ft.
Greatest rise on Pacific	23.30 ft.
Least rise on Pacific	9.70 ft.
Mean tide of Pacific above mean tide of Atlantic	0.45 ft.
High spring tide of Pacific above high spring tide of Atlantic	10.12 ft.
Low spring tide of Pacific below low spring tide of Atlantic,	6.00 ft.
Mean low tide of Pacific below mean low tide of Atlantic	5.00 ft.

The variation of the tide, as shown in the foregoing table, necessitates locks at each end of the canal, should the thorough cut be adopted.

The Suez canal has cost $100,000,000, but has nineteen feet of water. The foregoing estimates are based, you will see, upon thirty feet; and whenever the Government of the United States undertakes the construction of a ship canal, they should never stop short of building one that will pass the largest vessels.

Most or all of the estimates for a ship canal you will find, upon examination, are for small canals, not calculated to pass the larger class of ships.

NEW YORK, May 1, 1870.

MINING SUMMARY.

California.

A MINING REGION FOR MEN OF MODERATE DESIRE.

A correspondent of the San Francisco *Bulletin*, in traveling through the old mining camps of northern California, directs public attention to the fact that the mines of Butte county are not, as is generally supposed, exhausted; but are still being worked, paying handsome profits. He declares Butte county as just the place for hard-working men of moderate desires, who, having borne the brunt of excitements and disappointments, are willing to settle down to steady but moderate compensation as the reward of their daily labor. Says the writer:

"That which has taken other countries centuries to accumulate, California has accomplished in a score of years, and now, after the lapse of twenty-one, has a past to look back upon; an early times to refer to, pregnant with the land-marks and incidents of a bygone day, and filled with the records of events that would seem separated from us by ages instead of so short a period of time. There are three different ages in the history of our State. First, the Spanish, or pastoral; second, the age of gold; and third and last, our glorious one of cereal wealth. Not that the age of gold is over; far from it; but the halcyon days—the days of big strikes and magic-made fortunes—is past. There is still much valuable mining ground left, but it takes both capital and labor to work it, and many prefer, now that our farming interests have proved so wonderfully remunerative, to devote their time and money to tilling the soil.

"GROVILLE,

Situated on the south side of Feather river, in Butte county, may be considered as the former capital of our northern mines. A large mining camp itself, it also became a commercial centre, supplying the different sections contiguous to it with supplies of every description. It was a thriving city, with great teams constantly coming, and alive with the noise and bustle of business. But this was in the past. It no longer retains its early greatness, and though still a centre of trade, and a place of no small importance, it has gradually shared the fate of the mining counties from whence it derived its support. The town is rather prettily situated on what may be termed the river bottom; the hills that rise directly behind it stretching out in a plain, level country, to Marysville, twenty-five miles distant. A railroad connects the two places, and if the company owning it do as large a business as the mileage charged, it certainly should be a thriving institution. The damages for riding those twenty-five miles is $2 50. Two good scow ferries connect the south with the north side of the river, where hydraulic mining is still being carried on in a bank over fifty feet deep, but which is said to contain gold from top to bottom.

"FORMER TOIL.

"The evidence of immense labor in the past is discernible on all sides. Flumes, ditches and cuts, some going rapidly to decay, and others in a state of preservation, traverse the country about the town in every direction. After ascending the northern bank, a large plain spreads out before the sight, bordered in in the distance by low, broken mountains, in which are situated the well-known camps of Dogtown, Cherokee Flat, Mineral Slide, Butte creeks, and other localities of mining notoriety. On the plains is Thompson's Flat, a former rich camp, but now nearly worked out, supplied with water from Little Butte by a ditch some fifteen miles long. The plains are sterile, and fit only for grazing purposes during the rainy season. Dogtown, situated in the mountains, twenty-five miles north of Oroville, is a village of the past. The times were when Dogtown boasted hotels, stores and saloons in active operation, but those days are past, and the town at present is but a sad remnant of its former self. The mountains surrounding it were covered with a heavy growth of timber, with sawmills in active operation; but the timber is cut down and the sawmills removed, though to the north of the village, on Dry creek, there are yet several mills cutting a fine quality of yellow and sugar pine. From Dogtown roads lead to Inskip and a dozen other mining towns scattered through the mountains, yet there is but little travel, and all appear to appreciate the fact that gold hunting is not what it was.

"GOLD NOT EXHAUSTED.

"Lest some should fall into the error of thinking that gold mining in Butte county is entirely played out, I would inform them that there are many good mines still being worked, paying their owners handsome profits; but the days of the pan and rocker are over, and with them depart that large class of rambling spendthrift men who make a community so lively. The mountains of Butte county have furnished millions of the precious metal to the world, and still the supply is by no means exhausted; but it is much harder to get at, and does not offer the inducements that allured so many ten or fifteen years ago. Six miles west of Dogtown is Minshew, another small camp, situated on the mountain ridge that divides the

"BIG AND LITTLE BUTTES.

"The Big Butte has its source on a lava bed, away up in the north-east part of the county; flowing down to within twelve miles of Chico, where it is joined by the Little Butte, coming in from the east. They then form quite a respectable stream, and running down into the valley of the Sacramento, lose themselves in an extensive slough or sink.

"BIG BUTTE.

"At Minshen there are two large drifting or tunnel claims, paying well. South of it, at Mineral Slide, on Little Butte, a boy took out $500 in one day, during the past winter. Descending the ridge, to the north, we reach Big Butte creek, in early days one of the liveliest gold districts in the State. It is estimated that no less than 5,000 men worked along the banks of this little creek at one time, during '58 and '59. Busy little mining towns were located at intervals of two or three miles apart the entire length of it. An ounce a day was often made, and big strikes of from $500 to $600 were not unfrequent. On all sides the evidence of past prosperity and immense labor greets the traveler.

"DITCHES.

"The banks of the creek for rods back are nothing but bare stone piles, while long, deep, bed-rock cuts reach back to some heavy sluicing place, and the mouths of deserted drifts stare one in the face everywhere. Ditches still abound, but they are far from paying property. Formerly $20 a week were paid for 30 inches of water; to-day 100 inches can be had for $5, while in many instances valuable flumes or timber work has given away, and the ditches lay idle, caving in and gradually going to destruction, their owners not feeling warranted at the present state of the mines in repairing them. The sand bed-rock throughout this section is interspersed with streaks of soft, black clay, containing quantities of sea shells. Above the bed-rock rises a lava formation, extending all over the hills, impressing one with the idea that the ages are not long numbered since the entire country was one vast scene of volcanic eruption.

"PAY DIRT.

"There is an opinion prevalent amongst miners, a number of whom are still left in the vicinity, that the mines are by no manner of means "played out," but that the precious metals still exist in large quantities in the gravel, where, though it may be hard to get at, it will yet pay labor and capital to go after it. Several intelligent miners who have spent nearly twenty years in this locality, gave their opinion to the effect that the prosperous days of the miner were not over, but that a reaction would set in against this grand hegira that has taken place of late years, and repopulate the mining camps. They assert that in the times when they were making $20 a day, there were a number discontented, who rambled in search of bigger things. After a time, when the easy-worked ground was exhausted, and $5 diggings were about the best to be had, men, thinking of what had been, became disgusted and would no longer work at mining, especially when the allurements of valley life were held out in such glowing pictures to them. But the day is fast coming in California when labor will be nearly as cheap as it is in the States, and when such times arrive men will return gradually to the deserted mining grounds, where from $2 to $2 50 a day is still to be made, and will be for many a year to come. My own impression is that our mining counties will yet be repopulated by a steady, working class of moderate desire.

"MINING NOMENCLATURE.

"The nomenclature of our mining districts attest the reckless, rollicking nature of the times and men when they were made. A latent facetiousness or broad humor is frequently developed. For instance, 'Rich Strike' may have impoverished every man who ever attempted to work it, while 'Happy Gulch' was the most mournful place in the country. 'Whiskey Flat' rises into 'Blazes,' and from thence slopes away two miles to 'Destruction.' 'Helltown,' 'Paradise,' 'Destruction,' 'The Bone Yard' (the latter an irreverent application to an ancient burial place), in connection with Diamondville and Centerville, were in the past the principal places of resort along Butte creek. They are now nearly defunct.

"THE PRESENT AND THE FUTURE.

"There are still a large number of men engaged in mining throughout the county. The work is chiefly carried on by tunneling or ground sluicing, the average pay being from $2 to $3 per day to the hand. Rich strikes are still occasionally made, and frequently parties, after having cut through the bed-rock for four or five months, come upon a back channel, where they take out three or four ounces, and even more, a week. Others again start in on a flat, where, by doing a fair day's work, $2 a-day, or $2 50, may be made the whole of the year round. There is yet room for many laboring men in these partially deserted places. Cabin life is still nearly universal, and a man may start in to work although possessed of but little means. If a man is 'dead broke' and shows a disposition to work he will generally find the storekeepers and miners very kind, assisting him all that they can by loaning such things as are necessary for him to start in with. California still extends superior inducements to those possessing industry, energy and frugality."

Nevada.

EGAN SHUT DOWN.

"We regret to learn (says the White Pine *News*, May 27) that the splendid new 20-stamp mill of the Social and Steptoe Mining Company, at Egan cañyon, has proved a failure—or rather that the mill, by its present process of working, cannot make the rock pay, and that the mine has been closed, the mill cleaned up, and operations

will be suspended for the present. This will throw nearly one hundred men out of employment, most of whom are expected to arrive here on Saturday. It is represented to us the ore of the Social and Steptoe mine is rapidly passing into sulphurets, and that the mill will have to change to 'dry crushing,' and heavy machinery be procured for hoisting. This will require several months' time, and in the interim the camp will take a nap."

STRIKE AT BELMONT.

The *Reveille* is informed that an important strike has been made in the El Dorado South, belonging to Messrs. Leon & Co. A cut through the vein near the bottom of the incline, at a depth of two hundred and thirty-seven feet, has disclosed a body of magnificent ore (stetefeldtites) which has every indication of being extensive. A quantity of this very rich ore has already been taken out.

METACOM MINE.

The machinery some years since erected on the imaginary mine "Great Republic," has been bought by Mr. John Howell, who will place it upon the Metacom.

THE DUNDERBERG MINE AT ESMERALDA.

According to the Carson *Appeal*, May 21st, this mine is likely to prove one of the best. One ton of average rock worked in Aurora, a few days since, yielded $33, mostly gold. Some assays of ore from same drift showed $1,800 to the ton, $300 of which was in silver.

BULLION ACCUMULATION AT WHITE PINE.

The *News* says: "The Alsop Smelting Company has 130 tons of bullion on hand, and other furnaces will probably swell the amount piled up to over 200 tons. Transportation for ore also is needed. The Erie and Elko (base) have each a contract with San Francisco parties to furnish 400 tons. These things suggest a railroad to Elko. Furnaces would be erected at once to turn out 100 tons daily. The average yield of the base ores is 50 per cent. of bullion. A later date of same says a meeting is appointed to discuss the thing, and the citizens enter heartily into the matter. Bullion shipments for week ending May 16th foot up $37,028 31—of which $25,181 62 went west, and $11,846 69 went east."

THE MINERS AT WORK.

The *News*, May 23, says that work is resuming on all the better known claims, and on many not yet at all opened; and miners are in demand every day. Practical miners are paid $3 a day, gold, which is a higher rate than is paid anywhere in the State.

OUTSIDE DISTRICTS.

In Cooper district the shaft of the Rappahannock is down 44 feet, at which level the ledge has been found to be 40 feet wide—28 feet of good milling ore. The ore is easily broken down. Gen. Grant has between three and four feet of good milling ore, at a depth of ten feet. Assays go about $200 to the ton. The Mollie Rutter has 75 tons of high-grade ore on dump, and commenced to ship to the Parsons mill at Silver Park. Three thousand pounds of ore from the Great Eastern mine in Patterson district, worked at the Big Smoky mill, gave a yield of $212 to the ton. Ely disrict sent in four bars of bullion, a few days since, valued at $1,600. Reports from Kern are favorable. The miners will develop extensively this season. New discoveries are continually making.

WASHOE PLACER DIGGINGS.

We understand, according to the *Enterprise*, that parties are still engaged in placer mining about the head of Little Valley, west of Washoe lake, Washoe county. In the spring of 1861 very good diggings were struck in the ravine coming down from the hills near the south-western corner of the lake, since which time there has been more or less surface mining every summer in that direction. As the parties in Little Valley have returned and "mined it" every season for six years past in that vicinity, it is supposed that they must have found sufficient gold to pay them for their labor. The gold obtained is similar in appearance to that found in the ancient river channels of California, and it is supposed that it came from a break in some such channel upon or near the summit of the Sierra Nevada mountains. Prospectors say that gold, evidently from the same source, can be found in certain ravines among the mountains west of Lake Tahoe. The "spew" to the eastward must have crossed the spot where Lake Tahoe now lies, perhaps when mountains reared their peaks where now the lake rolls its waves. The gravel streak containing gold can be traced by broken pieces of lava of a peculiar texture and color which strew the surface of the ground. Some "big diggings" may yet be discovered in this as yet but partially explored region.

New Mexico.

THE NEW EL DORADO.

An officer of the Army who has just returned from a trip to the newly discovered El Dorado in New Mexico, and naturally enough with his head full of air castles, in which silver constitutes the principal feature, sends to the *Army and Navy Journal* a description of the new mines. In the extreme south-western part of New Mexico, about fifteen miles from the Arizona line, and some thirty or forty from the Mexican, is a group of mountains called the Pyramids. At the extreme northern end of the group, where they cease to become mountains and are only hills, varying from 300 to 800 or 900 feet in height, is this new-found fountain of wealth. As you approach from the east the first object that attracts attention is a hill, the highest in the immediate vicinity, from which an immense ledge of rocks projects, like a huge stone wall, running clear over the hill, up one side and down the other. This can be seen for about fifteen miles before reaching it. As you draw nearer you see a number of hills of different sizes clustered together and all presenting the same feature of the stone wall, but with nothing else to distinguish them from the other hills in this country.

At the mines themselves you are surrounded by a group of hills all nestled together so that you can hardly tell where one stops and the other begins. Over nearly all of them are built immense irregular stone walls, varying from one to fifty feet in height, with the same irregularity in thickness.

Attention was first drawn to these hills, which have thus stood for ages unnoticed, in the following way: Some year or more ago a gentleman going through to California picked up at Barney's Station, while the stage was changing mules, a "pretty" stone, and putting it into his pocket, took it with him to San Francisco. Last winter it happened to be seen by an expert miner, who asked where it came from. Learning the exact place, he immediately set to work to find it, and sent out a party with a reliable man at their head. Arriving at Barney's Station in February last, they immediately struck for the nearest hills to find where this piece had "floated" from. Upon reaching this group and breaking the rock, they found, to their great surprise, evidences of wealth that they could hardly believe possible. Having prospected thoroughly, and taking with them a sufficient quantity of specimens, they returned quietly to San Francisco and made their report. Upon assaying the quartz the poorest specimens show a yield of twenty dollars of silver to the ton of ore, while the richest turned out four thousand dollars. The entire lot show an average of four hundred dollars. This immense yield astonished them. The San Francisco Mining Company, of which these men were parties, immediately sent Mr. ARNOLD (the expert first sent out) back to secure the mines, or as much as the laws would allow them to take up, and he having reached there and located his claims, the news was spread, and miners flocked there from all directions. Such is the account of these which we receive from the correspondent, who reports that during his trip he visited with Mr. ARNOLD many ledges which appeared to be immense veins of quartz that have been forced up through the earth to the surface, and as the surface has gradually washed away, these have been left standing. Upon breaking it open it presents a beautiful combination of colors and metal. Most of it is impregnated with copper, and galena can be seen glistening all through, while slight traces of iron can be readily distinguished, and the silver in dark gray or blue spots completes the variety. The principal ledge, called the "Robert E. Lee," is by far the largest above ground, and crowns the summit of the highest hill. It is about fifty feet high and the same in thickness. The other ledges vary in height and thickness. The sides of the hills and the ravines are a complete network of smaller veins running in all directions, and new claims are being discovered nearly every day on the plains at the base of the hill. Water is found in abundance by digging in the ravines, at from fifteen to twenty feet below the surface. Wood is the only thing wanting, and that will have to be brought from a distance of about twenty-five miles.

It seems wonderful that such rich mines could have been so long undiscovered and so near to a highway across the continent; and it does not appear that they were wholly unknown, for the remains of a rough mud and stone hut are still to be seen there, and two little tunnels about large enough for a man to crawl into have been found, with signs of ore having been taken out at some time—how long ago it is impossible to say—but evidently in the most primitive way and with simple tools. The area covered by these mines is about six square miles, and of course everything that shows itself above ground has been taken possession of. The laws of the Territory give the discoverer of any mineral claim the right to take 200 feet for the discovery and 200 feet in addition, all in his own name. Others coming after him can take but 200 feet each. A shaft or hole six feet square and five feet deep secures the title for a year, during which time he must sink his shaft twenty feet or satisfy the authorities that he has expended $1,000 upon his claim, when he can receive a patent, and his title is good for all time. If the work is not done his title goes by default. A large number of Army officers have secured claims and are very sanguine of results.

FURTHER IN REGARD TO THE NEW MINES.

A correspondent of the Amador, Cal., *Ledger*, writing from Fort Selden, New Mexico, May 4th, says: "I can only say the new mines beat all yet discovered for extent and richness. There is one lode, the Capitol, which is 40 feet above the surface, 200 feet wide, and assays from $20 to $1,200 per ton. There is another, the Leo, which is at least 400 feet high, 2,000 feet wide, and assays from $40 to $1,800 per ton; and there are a great many more. I saw assays from different leads running from $20 to $1,980—making an average of $680 to the ton—and all top rock. There is not a shaft sunk over six feet yet, and none of the rock assayed was taken from below the surface. Now for the disadvantages: In the first place, water will have to be brought from San Sumon Senaga, 32 miles, in iron pipes, and raised 900 feet. Wood will have to be hauled 40 miles. There will have to be at least a million and a half of dollars spent before the mines can be worked to advantage. The country is taken up for miles.

SALE OF THE MAXWELL GRANT.

The Santa Fé *Post*, May 21st, says: We learn that Lucien B. Maxwell, Esq., has effected a sale of his land grant to a company of English capitalists for the sum of six hundred and sixty thousand dollars.

OF AFFAIRS AT UTE CREEK.

The *Press and Telegraph*, May 14th, says: The Montezuma mill has again shut down for some reason, after a three days' run, cleaning up 25 ounces of retorted gold. The Aztec mill is at work, with moderate returns.

POLLOCK'S and BOWEN'S claims in Grouse Gulch are averaging $15 per day to the man.

A new cut has been made near the Mereno, by LITTLE & COMPANY, that pays $7 to the man, ground sluicing. At Orleans Flat and Last Chance, two claims are being worked with large returns. On Willow gulch the pay is good, but the miners have no water. There is a fair supply of water on Spanish bar. The Humbug gulch folks have everything in readiness.

Montana.

THE CEDAR CREEK MINES.

The following letter, forwarded to the Helena *Herald*, by a well-known citizen, gives, what appears to us, a fair account of these new mines as they now exist:

LOUISEVILLE, Cedar Creek, M. T., May 21st, 1870.

I arrived here about two weeks ago, and have been staving off the letter promised you, from day to day, thinking the longer I delayed writing the more familiar with this region I would become, consequently, the nearer correct I could write you, in regard to its resources and business generally. But with only two weeks observations in an extensive mining region, a person may be led to err as to its actual merits or demerits; however, I will state facts as they now exist, and give you my judgment of Cedar Creek, tributaries, &c., backed by twenty-one years experience in a gold producing country.

First, Cedar creek is a stream of no small importance. It takes its start from the snow-clad peaks of the Cœur d'Alene mountains, and wends its course in a north-westerly direction, through an abrupt, densely timbered gorge, for a distance of about thirty miles, to where it mingles its waters with those of the Missoula, forming one of the principal streams which flow into Pen d'Oreille river, from thence emptying into the great Columbia.

To reach these mines the tourist from either east or west leaves the old Mullen road and crosses the Missoula river, near the mouth of Cedar, where he finds a path, or mule trail, leading up the creek for a distance of seven miles, to a settlement called Cedar Junction, being the junction of Oregon and Cedar creeks. This settlement contains some thirty or forty finished and unfinished buildings, claiming a population of twenty-three inhabitants. The creek is staked and claimed for mining purposes from the junction to Missoula, and it is generally believed that it will pay miner's wages, as soon as the water recedes sufficiently to enable the gravel in the bed of the stream to be worked. Fair prospects of gold have been obtained from Oregon gulch, which stream is very nearly as large as Cedar, above the junction, but creates little or no excitement here.

From Cedar creek junction, up Cedar creek, it is four miles to a flourishing little town, called Kiyus, where mining has commenced in good earnest. Many claims are opened, and are represented as paying well. From Kiyus to Louiseville, a distance of four miles further up the creek, men are at work on nearly every claim, but I can only give rumor as to what their claims are paying. Generally speaking, a miner working ground that yields well, keeps the result to himself, and one whose claim pays poorly, is quite certain to keep it to himself, therefore all that I can judge from is the labor, which speaks volumes for itself.

Louiseville is the principal place of business on the creek, although there are other settlements still above, the nearest being four miles, and called Forrest City. Mining, and preparations for mining, are being carried forward on nearly every claim from Louiseville to Forest City, and from there up, more or less labor has been performed—sufficient to induce all owning interests to prepare for washing out gold as soon as the snow disappears from their claims. Discovery claim, opposite Louiseville, is worked by twelve men, running two strings of sluices. I have heard it stated that the company have cleaned up as low as $7 per day to the man, and again it is rumored, and the same is believed by many, that they cleaned up $3,000 to a day's run. There are several tributaries putting into Cedar creek, which are represented as prospecting well. Some of them are believed to be even richer than the main stream. I will here give you the names of several of the tributaries that are known to prospect good, the majority of which are now being worked.

First, Snow-Shoe, California, Home Stake, Illinois, Wolverine, Lost Gulch, My Mary Ann, Montreal, Boulder, Rabbit Creek, &c. Prospects have been obtained from either side of the range from Cedar creek, and now, taking all and all into consideration, I cannot avoid believing but that this region will prove itself a very prosperous mining country.

Canada.

SALT IN WARWICH, ONTARIO.

"In his report on the salt region in Ontario in 1866, and again in that for 1869, which we noticed the other day," says the *Montreal Herald*, "Dr. Sterry Hunt concludes from various considerations that boring in the vicinity of London and Enniskillen to greater depths than the oil wells of that vicinity, may reach saliferous strata capable of yielding valuable brines. This, we are happy to say, has been confirmed by a recent boring at Warwich, a township about 50 miles west of London and joining Enniskillen on the north-east. Here an unsuccessful oil well has been taken up, and after reaching the corniferous limestone, the boring, carried 600 feet farther, struck at 1,220 feet the salt-bearing marls at the base of the salina formation, from which a brine has been obtained marking from 90 to 95 degrees of the salometer. It has been analyzed by Prof. Croft, and although it does not equal the surpassing purity of the Goderich and Clinton brines, is both much purer and stronger than those of Michigan and Pennsylvania, so extensively worked. This new opening is called the Elarton well, and is on the lands of Charles Kingstone, Esq., a large proprietor in Warwich. The discovery of salt, so far southward of Clifton, leads to the supposition that the whole intermediate region may be underlaid by a salt basin, in which case it will one day become the great salt producing region for this Continent."

Missouri.

HESSELMEYER'S ZINC WORKS.

Mr. G. F. HESSELMEYER, who spent a fortune in experimenting to demonstrate the practical value of Missouri zinc ores, says the St. Louis *Review*, has now his reward, in having established two extensive manufactories in Carondelet. The present "Missouri Zinc Works" are the pioneer Hesselmeyer works, enlarged and reorganized. The St. Louis Zinc Company are the new works which are fully described in these columns some time ago. Mr. HESSELMEYER is president of the latter company, and an idea of the success of these works may be formed from the fact that on Wednesday last they sold 1200 tons of zinc, in slabs, amounting to $168,000! This is but another practical illustration of the manner in which the mining and manufacturing resources of this State can be developed.

THE PILOT KNOB IRON COMPANY.

The St. Louis *Review* says: The Pilot Knob Iron Company are increasing their mining force, and shipping more ore than heretofore. They have also opened a large vein of magnetic ore on Shepherd mountain, which they are mining for shipment. There are several valuable deposits of iron, marble, kaoline, &c., which will be developed and rendered valuable by the completion of the first section of the railroad beyond Pilot Knob.

Idaho.

THE MINES OF BOISE COUNTY.

The *World* contains the following: From Mr. CLARKSON, of Summit Flat, who was in our city a few days since, we learn that the snow in that section of the country still lies to the depth of from six to seven feet, but it has settled and packed to such an extent that persons can travel over it without snow-shoes. Mr. CLARKSON informs us that he has about 150 tons of ore out on the dump, taken from the Mammoth lode during the winter, but that he will be unable to get his mill started to crushing for several weeks yet. Mr. GOODWIN'S mill started up a few days ago on rock from the King ledge. The ore looks well in both lodes, and owners anticipate making a "good thing" during the summer.

From Dr. C. E. FREEMAN, of Centreville, we learn that the mill of the Gold Hill Mining Company, on Granite Creek, a short time since, cleaned up after a ten-days' turn, on what was considered refuse quartz the sum of $4,200.

ITEMS FROM BAKER CITY.

The following bits of news are taken from the *Bed-Rock Democrat*: A chunk valued at $800 was found on the 6th instant, in the claim of Remlee & Company, on Bow Creek, about eighteen miles from El Dorado, and its actual value is $812. The parties who own the claim have been drifting for some time past, the chunk was found in the drift dirt. The news from all the mining camps continued cheering.

Oregon.

BAKER CITY.

The mining season has opened brisk in Barker county. About $80,000 in gold dust and buillion was shipped, for the month ending May 10th. Water was plenty and claims paying well. One nugget worth $800 was taken out.

Japan.

The Japanese government has decided to allow foreigners to be employed, under certain regulations, in working the mines of that country. But the restrictions are such that no great influx of "outside barbarians" can be expected just yet.

BUSINESS AND PERSONAL.

[*Short notices in this column fifty cents per line each insertion.*]

GLYNN'S ANTI-INCRUSTATOR FOR STEAM BOILERS.—THE only and reliable article for removing and preventing incrustation. No foaming, and does not attack metals of boiler. Liberal terms to agents. C. D. FREDRICKS, 587 Broadway, N. Y.
April 19 tf.

MARKET REVIEW.

The Coal Trade.

NEW YORK, June 16, 1870.

WHOLESALE.—There has been a good trade during the past few days, and "Trinity Building" seems herself again. As we anticipated, dealers are convinced that "Schuylkill, out or in," little difference can be made in prices at this late season, and they are coming in the market to supply a portion of their wants, at least. The stocks of coal at the shipping points are light. Dealers even go down to the various places to see this for themselves. Notwithstanding that we have heard so much of the eternal strike, in Schuylkill Co. during the past three months, she has kept up her shipments mysteriously well, and this week only shows some 150,000 tons decrease, compared with last year this time; and the grand total amount of coal mined thus far this year over last, up to the present time, is some 1,000,000 tons. To be sure, the last mentioned amount is not much to a country that consumes such immense quantities of coal as we do; but it is sufficient to keep matters steady. We can use up this surplus easily through the fall, if there is a fair amount of increase or even a return of thrift to our various manufactories and other industrial pursuits of the people, and which there are fair promises of. Better a surplus than a deficiency any time, for all parties concerned. Gentlemen, use your endeavors to keep a steady market, buying in small lots and often.

We have been furnished the following Circular by a member of the Executive Committee of the Anthracite Board of Trade, and deem it of sufficient importance to every coal-dealer and consumer in the country to give it space in our columns. It demonstrates that our recent attacks upon the miners for the niggardly and selfish manner in which they have conducted themselves during the late troubles, were not uncalled for. The colliery referred to in this circular is one of the largest in the Schuylkill district, above water level, and the coals are known in this market to be of the best quality. The workmen refuse to work for less than three dollars, basis, and yet will not work this A No. 1 colliery and pay the owner ten cents per ton and interest on his investment. This clearly shows that there is some "nigger in the fence," and that there is no reason, honor, or sense of justice, in the leaders of this conspiracy among the miners, to raise the price of coal:

CIRCULAR.

ROOMS OF ANTHRACITE BOARD OF TRADE,
POTTSVILLE, June 7, 1870.

COL. JAMES J. CONNER:

Dear Sir: We have heard it reported on the street, by men belonging to the W. B. A., that you had made a proposition to John Siney, and a committee of your men, to work your collieries at a profit of ten cents per ton and six per cent. interest for the capital invested, and wear and tear of stock, and that Mr. Siney had accepted your offer, and you had then backed out, and that the men were very much exasperated at your backing out. If there is any foundation for the story, will you be kind enough to furnish us with the facts in the case, together with any correspondence you may have in relation to the subject, for publication.

An early reply will much oblige, Yours, truly,
EXECUTIVE COMMITTEE,
A. BOARD OF TRADE.

ASHLAND, June 8, 1870.

EXECUTIVE COMMITTEE, A. B. OF T.:

GENTLEMEN: Your favor of yesterday just received; there was such a proposition made by me, and I will give you the facts as near as I can, so that you can judge for yourself who did the "backing out." On Monday, May 30th, I made the first proposition to Mr. Siney, as follows, viz: "I will give you my collieries for the balance of this season at an advance of ten cents per ton on the royalty and interest on the capital invested and wear-and-tear of stock, provided you will give me security that the gangways shall be driven continuously, and all work prosecuted in the same manner as has been done by me, and that you will live up to the requirements and obligations of my contract with the city of Philadelphia, my lessors." Mr. Siney replied that it was a fair offer, and asked me whether I would authorize him to make that offer to the men. I answered, yes. He replied that he would do so to-morrow, and that he would first give the men at my collieries a chance, and if they did not accept he would find other parties who would, *inside of twenty-four hours*. The following day a committee of five waited upon me. We had a plain talk covering the whole ground, the committee fully understanding the nature of the proposition. Two of them told me it was in substance exactly what Mr. Siney had told them. The interview closed that day by the committee telling me that they had no authority to act in the matter—that they had been merely appointed to understand more distinctly my views and report back to their meeting.

On Friday, June 3d, a new committee, with the exception of one man, called upon me, and we went over the whole ground again. They left me after stating that I would receive a letter from Mr. Siney that afternoon, and that they, the committee, with Mr. Siney, would meet me on Monday, June 6th, for a final settlement of the whole matter. I did receive a letter from Mr. Siney that afternoon, a copy of which I enclose you. I regarded the proposition embraced in this letter so absolutely absurd, that I did not deem it worthy a reply.

On Monday, June 6th, in accordance with the engagement made on Friday, I again met the committee, headed by Mr. Siney. After considerable discussion, *they declined accepting my offer*. The principal excuse they offered for so doing, was that they wanted the absolute control of the sale of the coal to make their own market and break down the "middle interest," as they considered them, (the middle men,) "a curse between the producer and consumer." As this part of the question was fully and fairly understood by Mr. Siney at our first interview, I regarded this *sine qua non* as a mere subterfuge, gotten up to *back out* of the whole affair. I, however, offered to give them a full guarantee that the coal handled by my consignees should net them the very highest price for such coal in the market, but they still insisted upon having the entire control of the coal. I must do Mr. Siney the justice to say that he expressed himself entirely satisfied with Messrs. Agard, Moody & Co., and he said if he had any coal to dispose of he would choose them as his consignees.

This is the substance of the whole affair. As regards any misunderstanding of my original offer, I can produce the evidence of those present when I made it to Mr. Siney, if necessary. Yours, truly,
(Signed,) J. J. CONNER.

The following is Mr. Siney's letter referred to in Col. Conner's communication:

JAMES J. CONNER, ESQ.—Sir: I wish to say a few words to you on the proposition of letting your mines. The proposition that you gave in writing to the committee of five that waited on you is not in accordance with the offer made to me. I understood that the percentage on the ton was to cover all except the royalty. If you, yourself, that is acquainted with the business of the trade, cannot make it pay interest, how can these men make it pay interest on the invested capital, and also pay you ten cents per ton in addition to the royalty? Would it not be better for you to say five cents per ton, and be sure of that for the remainder of the year, than to charge them ten cents per ton, and get nothing? The meaning is simply this, if the men can make it pay at five cents per ton, they will work the colliery. If they find that they cannot make it pay at ten cents, they will abandon the colliery. As you are a gentleman endowed with good reasoning faculties, judge for yourself. I have your own words to say that you cannot make it pay interest on the capital invested. How are these men to do it and pay you ten cents per ton in addition to all other charges, and being ignorant of the trade, and also a depressed market?

Seal of Ex. Committee W. B. A.

JOHN SINEY.

Anthracite Coal Trade for 1869 and 1870.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending June 11, 1870, compared with week ending June 12, 1869.

COMPANIES.	1869. WEEK.	1869. TOTAL.	1870. WEEK.	1870. TOTAL.
*Phila. & Reading R.R.	9,851	1,185,833	31,881	1,025,672
Schuylkill Canal		103,044	3,937	36,349
Lehigh Valley R. R.	801	1,071,466	64,931	1,440,292
Lehigh & Sus. R. R.	406	301,544	25,975	431,840
Lehigh Canal	387	174,033	21,223	130,994
Scranton North		20,857	14,733	287,198
" South		567,630	35,041	788,589
Penn. Coal Co., rail	23,427	393,312	25,120	462,879
" " " canal	768	5,454	837	5,611
Del. & Hud. Canal Co.	42,666	436,692	49,350	494,699
" " R. R.	73	98,114	8,185	224,734
" " " south		44,750	13,727	182,559
Shamokin	1,498	141,632	5,114	138,001
Trevorton		7,051	3,093	36,518
Lykens Valley Coal Co.	1,700	23,262	5,926	31,943
Wyoming South	834	38,601	13,513	77,140
P. N. Y. C. & R. R. Co.			4,864	132,708
Williamstown, Col'y		56,694	6,584	119,262
Short Mountain		36,871		
Total	82,351	4,990,790	335,935	6,069,898
1869			82,351	4,990,108
Increase week and year			253,611	1,079,108

* Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1869 and 1870.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending June 4, 1870, compared with week ending June 12, 1869.

COMPANIES.	1869. Week.	1869. Year.	1870. Week.	1870. Year.
B. & O. R. R.	20,638	390,166	20,288	353,297
C. & O. Canal	19,116	184,848	18,477	177,254
H. & B. T. R. R.	8,981		6,874	134,276
Harrisburg & D.			14,185	344,227
L. V. R. R.		552		6,622
P. & N.Y. C. & R. Co.			5,787	101,501
	48,735	721,579	65,611	1,117,177

Schuylkill Coal Trade.

Report of Coal transported via the P. and R. R. for the week ending June 9, 1870—less coal carried for Company's use, and Bituminous Coal:

For week	31,881 03
Previously this year	996,791 13
Total	1,028,672 16
Same time last year	1,185,853 00
Decrease	157,180 04
Amount sent same week 1869	9,851 00

Amount of coal transported on the Philadelphia and Reading Railroad for the week ending Thursday, June 9, 1870:

From St. Clair	
" Port Carbon	3,654 18
" Pottsville	381 19
" Schuylkill Haven	14,044 18
" Auburn	1,266 12
" Norristown	57 06
" Port Clinton	10,691 09
" Allentown and Alburtis	1,784 01
" Harrisburgh and Dauphin	14,155 13
Total paying freight	46,086 16
Coal for Company's use	1,157 04
Total for week	47,224 00
Previously this year	1,327,037 07
Total	1,374,261 07
To same time last year	1,474,361 07

Report of coal transported over the Schuylkill Canal for the week ending Thursday, June 9, 1870.

	Tons. Cwt.
From Port Carbon	1,053 00
" Pottsville	170 00
" Schuylkill Haven	2,483 10
" Port Clinton	251 00
Total for week	3,957 10
Previously this year	32,392 04
Total	36,349 14
To same time last year	183,044 15

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company, for week ending Saturday, June 11, 1870.

	WEEK.	SEASON.
North	49,020 12	1,009 148 07
South	13,727 12	182 558 15
Total	62,748 04	1,191,707 02
Corresponding time in 1869.		
North	1,694 15	704 772 04
South		42,033 12
Total	1,694 15	746,805 16
Increase North	47,325 17	Increase 304,376 03
Increase South	13,727 12	Increase 140,525 03
Total Increase	61,053 09	Increase 444,901 06

Report of Coal Transported over Lehigh Valley Railroad

For the week ending June 11, 1870, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREV'LY. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Wyoming	12,583 13	311,599 15	324,183 08
" Hazleton	51,488 09	884,000 15	935,489 04
" Upper Lehigh	345 13	5,914 05	6,259 18
" Beaver Meadow	21,868 16	300,492 00	322,360 16
" Mahanoy	3,102 03	113,564 08	116,639 14
" Mauch Chunk		447 17	447 17
Total Anthracite	89,388 14	1,616,025 00	1,705,387 01
Bituminous Coal recv'd from Cata. R. R.			
N. C. R. R.			
E. P. R. R.		6,622 00	6,622 00
P. & N.Y. C. & R.R. Co			
Fall Creek			
Schroeder			
Towanda			
Total by rail and canal	89,388 14	1,622,647 00	1,712,009 01
Same time last year	801 03	1,070,615 05	1,071,416 08
Increase	88,587 11	552,031 15	640,592 13
Decrease			
Forwarded East from M'h Chunk by rail	64,931 04	1,375,361 00	1,440,292 04
Same time last year	776 03	950,412 01	951,188 04
Increase	64,155 01	424,948 19	489,104 00
Decrease			

RECAPITULATION.

Forwarded East from M'h Chunk by rail	64,931 04	1,375,361 00	1,440,292 04
To N. C. R. R., at Mount Carmel		115 00	115 00
Forwarded North from L. & B. Junction	4,865 16	127,416 10	132,282 06
To L. & S. R. R. at Packerton for rail	129 01	3,827 10	3,986 11
Delivered at M'h Chunk	36 16	641 16	651 19
Delivered on line of road above Mauch Chunk	170 14	6 711 15	6,882 09
Delivered above M. Chunk for use of L. V. R.R.	928 13	26,789 18	27,718 13
To L. & S. R.R., at P'n Hav., for railroad			
Do. for canal	12 526 09	49,696 13	62,123 02
At M.Chunk for canal	5,769 19	25,564 18	31,334 17
Total Anthracite	89,388 14	1,616,025 00	1,705,387 01
Bituminous Coal		6,622 00	6,622 00
Total all kinds	89,388 14	1,622,647 00	1,712,009 01

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending June 11, 1870—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1870. tons ct	WEEK, 1869. tons ct	YEAR 1870. tons cwt.	YEAR, 1869. tons cwt.
Wyoming Region	32108 12	498 08	48434 01	256172 17
Upper Lehigh Region	4146 02		53165 06	56577 19
Mahanoy Region	195 04		195 04	8 8 01
Hazleton Region	12768 13		66158 16	52641 00
Beaver Meadow Region	5574 15	85 00	31223 09	2 802 10
Mauch Chunk Region		292 02	30089 18	118859 11
Totals	54811 06	875 10	665156 14	508931 18
Increase	53935 16		156224 16	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	23575 18	406 00	431840 05	301544 13
Forwarded East of Mch Chunk by Canal	25223 04	387 00	130994 03	174033 16
Delivered at and above Mauch Chunk	814 01	82 10	17688 15	14565 00
Delivered to L. & B. R. R.at Plymouth Bridge	4798 03		84633 11	13688 03
L. V. R. R. at Sugar N.				5100 03
Totals	54811 06	875 10	665156 14	508931 18
Of the above there was from Mines controlled by Co., W.B.C. & I.Co	18005 08	51 00	205440 16	124144 07
L. C. & N. Co		337 13	46743 15	132371 18
Totals	18005 08	388 13	252184 05	256516 05
Increase				
Decrease	17616 15		4332 00	

Harrisburgh and Dauphin Coal Trade.

The following is the amount of Bituminous Coal transported via the P. and R. R. for the week ending June 9, 1870:

	Tons.
For week	14,185 13
Previously this year	330,042 04
Total	344,227 17

Penn. and N. Y. Canal and Railroad Co.

REPORT of Coal Transported via the Pennsylvania and New York Canal and Railroad Company, for week ending June 11, 1870:

	WEEK.	PREVIOUSLY.	TOTAL.
Anthracite	4,865 16	127,842 09	132,708 05
Bituminous	5,787 00	95,714 00	101,501 00
Total, Ant. and Bit	10,652 16	223,556 00	234,209 05

Shipments of Cumberland Coal

for the week ending Saturday, June 11, and for the year 1870:

SHIPPED BY	B. & O. R. R.	C. & O. CANAL.	TOTAL.
Cooke M			
Borden	2,246 09	3,019 05	5,265 14
Consolidation	3,878 19	6,142 08	10,021 07
Spring Hill	629 11		629 11
Midlothian	306 14		306 14
H. and Baltimore	29 10	878 00	907 10
do Va M	1,465 14		1,465 14
V C & I Co	414 10		414 10
G. C. C. and I	2,444 13	704 16	3,149 09
Maryland	3,415 05	6,275 09	9 690 14
American	1,627 13	3,973 03	5,600 16
Atlantic	626 01		626 00
Piedmont	770 00		770 01
Swanton	1,085 19		1085 19
Barton	562 00		562 00
Potomac	1,821 10		1,821 10
Franklin	2,771 13		2,771 13
Big Vein	1,466 17		1,466 17
Total week	25 542 18	20 993 01	46 585 19
Previous	424,577 05	191,562 12	616 139 17
Total year	450,170 03	212,555 13	662,725 16

Statement of coal transported over the Cumberland and Pennsylvania Railroad during the week ending Saturday, June 11, and during the year 1870, compared with the corresponding period of 1869:

WEEK.

YEAR.	C. & O. CANAL. Tons.	C. & O. CANAL. Cwt.	B. & O. R. R. Tons.	B. & O. R. R. Cwt.	TOTAL. Tons.	TOTAL. Cwt.
1870	18,477	16	20,288	12	38,766	08
1869	19,116	16	20,638	0	39,755	02
Increase						
Decrease	639	00	349	14	988	14

YEAR.

YEAR.	C. & O. CANAL.	B. & O. R. R.	TOTAL.
1870	177,254 11	353,297 01	530,551 12
1869	184,848 05	390,166 03	575,014 08
Increase			
Decrease	7,593 14	36,869 02	44,462 16

Prices of Coal by the Cargo,

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK. June 17 R. A.	AT NEW YORK. June 17 W. A.	AT PHILADELPHIA, June 16. R. A.	AT PHILADELPHIA, June 16. W. A.
Lump	$— —	$5 00	4 50	— —
Steamer	— —	5 00	— —	— —
Broken	— —	5 25	— —	4 25 to 4 40
Egg	5 75 to 6 25	5 25	— —	4 25 to 4 40
Stove	— —to— —	5 75	— —	4 25 to 4 40
Chestnut	4 50 to 5 40	4 75	-	4 00 to -
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	6 00	— —	— —	— —
Broken	5 75	— —	— —	— —
Egg	5 75	— —	— —	— —
Stove	6 00	— —	— —	— —
Chestnut	5 25	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.				
Diamond Vein	R. A.	— —	— —	— —
New England		— —	— —	— —
Locust Dale	W. A.	— —	— —	— —
Honey Brook, Le'h	W. A.	4 75 to 5 75	— —	— —
Spring Mountain	" "	4 75 to 5 75	— —	— —
Sugar Creek	" "	4 75 to 5 75	— —	— —
Sugar Loaf	" "	4 75 to 5 75	— —	— —
Old Comp'y's	" "	4 75 to 5 75	— —	— —
Cross Creek	" "	4 75 to 5 75	— —	— —
Enterprise	" "	— —	— —	— —
Girardville	" "	— —	— —	— —
McMichael	" "	— —	— —	— —
Shamokin	" "	5 50	4 50	— —
Lykens Valley	" "	— —	— —	— —
Broad Top	" "	5 50	— —	— —
Hill & Harris	" "	— —	4 50	— —
Henry Clay	" "	— —	4 50	— —
Powelton	" "	5 50	4 50	— —

Prices for Coal at Mauch Chunk.

	F.L.	Bro.	Gra.	Egg.	Sto.	Cst.
Lehigh	$3 50	$3 50	$3 50	$3 50	$3 75	$3 00
Wilkesbarre	3 50	3 50	3 50	3 50	3 75	3 00

For freight to Elizabethport and to New York see "Freights."

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein..Lo.b. at Phila	$5 00
" Lemon "	4 75
Cumberland Vein Coal	5 00
Cumberland C. & I. Co.'s on board N. Y.	7 00
Maryland Coal Co. " "	7 00
Consolidated Coal Co.'s " "	7 00

[*Dealers in these coals may be found in our advertising columns.]

Company Coals.

	L.	Str.	Gra.	Egg.	Sto.	Ches.
Scranton at E. Port	4 50	4 60	4 75	5 00	5 75	4 60
Pittston at Newburgh	4 60	4 60	4 70	4 80	5 10	4 55
Lackawana at Rondout	4 50	4 60	4 70	4 90	5 20	4 50
Wilk'b're at Hoboken	4 75	4 75	4 85	5 00	5 35	4 60
Old Co. Lehigh at Pt. Johnston	— —	— —	— —	— —	— —	— —
Lehigh at E. Port	5 50	5 25	5 25	5 25	5 50	4 75

For freights to different points, see "Freights."

Prices at Baltimore—June, 1870.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 30@5 50
Pittston and Plymouth, do	5 00@5 25
Shamokin Red or White Ash, do	5 50@6 00
Lykens Valley Red Ash, do	5 40@5 50
Zerba Valley	25 5@— —
By retail, all kinds per ton of 2240 lbs	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 75@5 00
Fairmont and Clarksburg gas, f. o. b. at L. Point	5 35@5 50

Prices at Georget'n, D.C., & Alexandria, Va.

June, 1870.

George's Creek and Cumberland f. o. b. for shipping $4 55

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	—@—
Lykens Valley	—@—
Shamokin Red or White Ash	—@—
Trevorton and Zerba Valley	—@—

Prices of Gas Coals.

June, 1870.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr. 73 Pine st., N.Y.

	Duty, $1 25, gold.	Coarse.	Slack.
Block House	$1 75	@- 75	
Gowrie	1 75	@- 75	

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 75	@- 80
Little Glace Bay	1 75	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Coarse.	Slack.	Currency.
Fairmount Gas Coal Co. of N. Y.	7 50	@- —	
Despard Coal Co	$7 50	@- —	
Penn	— —	@- —	
Newburg Orrel Gas	— —	@- —	
West Fairmount Gas Coal	— —	@8 00	

AT PHILADELPHIA.

Powelton	$7 80

Prices of Foreign Coals.

June, 1870.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, New York.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	10 00@12 00
" House "	13 50@15 50
" " Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered.

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven	$2 00
From Port Carbon, 8 cents per ton more.	
Less drawback of 50 cents on all Coal shipped east of New Brunswick and south of Cape Henry.	

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 81
C. R. R., N. J., Easton to Elizabethport	1 12
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 28

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R. or L. & S. R. R. from M. C. to Easton	$ 81
C. R. R., of N. J., Easton to Pt. Johnson	1 19
Shipping expenses	25
Warfage	10
Total	$2 35

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 81
Morris & Essex R. R. Easton to Hoboken	1 19
Shipping expenses	25
Warfage	10
Total	$2 35

TO SOUTH AMBOY.

L. V. R. R.	81
R. & D. R. R. / Cam. & Am. R. R.	1 09
Shipping Expenses	25
Total	$2 15

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	95
C. RR. of N. J. Easton to Elizabethport	1 19
Shipping expenses	25
Wharfage	10
Total	$2 49

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 07
" Port Carbon	1 10
" Port Clinton	1 00

TO NEW YORK.

From Schuylkill Haven	$1 70

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$0 70
Freight and towage	1 07
Total	$1 77

TO NEW YORK.

Lehigh Canal	$ 40
Morris " / Freight, Towing	1 10
Total	$ 2,50

TO JERSEY CITY.

Lehigh Canal	$ 40
Morris " / Freight	2 00
	2 40
For re-shipment	2 20
Total	$

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	35
Freight	1,25
Towage	20
Total	$ 2,50

TO NEW BRUNSWICK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	35
Freight	1,05
Total	$ 2,10

For Re-shipment—30 extra for shipping, and 10 cents. drawback.

Freights.—JUNE, 1870.

TO EASTERN PORTS.	From Philada.	From E. Port and Port Johnston.	From Newbury...	From Rondout...
Amesbury	$2 75	$— —	$ 1 60	$
Bangor	2 75	— —	1 60	
Bath	2 00	2 00	1 80	
Boston	2 00	1 63	1 70	1 75
Bridgeport	1 60	1 00	1 10	1 20
Bristol	2 00	1 25	1 40	
Cambridgeport	2 50	2 00	1 85	
Derby	2 00	— —		
Dighton	1 85	— —	1 45	
East Cambridge	2 50	2 00	1 95	
Fall River	1 75	1 25	1 40	
Hackensack	1 95	1 50		
Hartford	2 75	1 35		
Jersey City	1 75	50		
Middletown	— 75	1 25		
Mystic	1 75	1 25	1 30	
New Bedford	1 75	1 40		
Newburyport	2 15	2 00	1 85	
New Haven	1 70	1 00	1 10	1 20
New London	2 00	1 15	1 25	1 30
Newport	1 75	1 25	1 40	
New York	1 25	50	70	
Norwalk	1 70	1 00	1 05	
Norwich and tow	1 70	1 35	1 35	1 40
Pawtucket	1 90	1 50	1 60	
Portland	2 00	1 75		
Portsmouth, N. H.	2 00	2 25	1 80	1 85
Providence	1 75	1 40	1 45	1 45
Rockport	2 10	— —		
Saco	2 50	2 10		
Sag Harbor	2 00	1 40	1 30	
Salem	2 00	1 60	1 75	1 75
Stamford	2 00	1 00	1 00	
Stonington	2 00	1 30	1 25	
Taunton	2 75	2 00		
Warren	— —	1 40	1 45	
Washington	1 10			
TO RIVER PORTS.				
Albany		90	— 60	
Catskill		— —	— 50	
Cocksackie		— —	— 50	
Cooyman's		— —	— 75	
Cold Spring		— —	— 35	
Fishkill		— —	— 30	
Haverstraw		50	— 60	
Hudson		— —	— 50	
New York		— —	— 70	
Nyack		50	— 60	
Poughkeepsie		— —	— 35	
Rhinebeck		— —	— 30	
Rondout		— —	— —	
Saugerties		— —	— 40	
Sing Sing		— —	— 75	
Stuyvesant		— —	— 55	
Tarrytown		80	— 75	
Troy		90	— 75	
West Point		— —	— 35	
Yonkers		40	— 60	

Foreign and Provincial Freights.

June, 1870.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons ..... £14 00@£16 00
Liverpool ..... 12s.6d@14s.ton

TO NEW YORK.

Provincial

Sidney	$—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.

Sydney	$—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Towing Rates.

TO EASTERN PORTS.

	Per Ton.
To New Haven	$ 40
Bridgeport	40
Southport	40
Westport	40
Norwalk	40
Stamford	40
	Per Boat.
Greenwich	$70 00
Port Chester	60 00
Mamaroneck	70 00
Glen Cove	
New Rochelle	55 00
East Chester	60 00
West Chester	30 00
White Stone	30 00
College Point	25 00
West Farms	25 00
Flushing	30 00
Harlem and Mott Haven	20 00
Port Morris	20 00
Ninety-first street and Astoria	16 00

Boats beyond Port Chester, with less than 200 tons, $80 per Boat.

TO RIVER PORTS.

Boats of 150—250 Tons.	Per Ton.
To Manhattanville	8 cents
Spuyten Duyvil	8 "
Yonkers	9 "
Hastings	10 "
Piermont	12 "
Dobbs' Ferry	12 "
Nyack	14 "
Tarrytown	15 "
Sing Sing	16 "
Croton Landing	17 "
Haverstraw	17 "
Verplanck's	17 "
Peekskill	18 "
West Point	20 "
Cold Spring	20 "
Newburgh	18 "
Poughkeepsie	22 "
Rondout	23 "
Boats of 100 Tons	Per Boat.
To Manhattanville, and Return	$11 00
Spuyten Duyvil	13 00
Yonkers	15 00
Sing Sing	20 00
Peekskill	25 00

METALS.

NEW YORK, June 17, 1870.

IRON.—Duty: Bars, 1 to 1½ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1½ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, 9 ₱ ton; Polished Sheet, 3 cents ₱ lb.

	Store Prices.
Pig, Scotch No. 1, ₱ ton	34 00@37 00
Pig, American, No. 1	32 00@34 —
Pig, American, No. 2	30 —@31 —
Pig, American, Forge	29 —@30 —
Bar, Refined, English and American	— —@75 00
Bar, Swedes, assorted sizes (gold)	85 00@100 00
Bar, Swedes, ord'y sizes, less 5 ₱ ct.	110 —@ — —
Bar, Refined " "	— —@ 77 50
Bar, Common " "	72 50@ — —
Scroll " "	87 50@115 —
Ovals and half-round " "	95 —@110 —
Band " "	95 —@ — —
Horse Shoe " "	95 —@ — —
Rods, ⅜ to 3-16 inch " "	85 —@120 —
Hoop " "	105 —@145 —
Nail rod, less 5 ₱ ct.	— 7 @—7½
Sheet, Russia, as to Nos. (gold)	— 11@—11½
Sheet, Single, D. and T. Common	— 4¾@— 5¾
Sheet, Galv'd, Nos. 14 to 26 12 and 14 c. 25@30 ₱ c. off	
Rails, English (gold), ₱ ton	59 00 @60 00
Rails, American, at Works in Pa	71 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 2½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 13 @— 15
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— — @— 18
American, Spring, do.	— 9 @— 11
American Machinery, do.	— — @— 12
American German, do.	— 9 @— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	— @— 30
Copper Bolts	— @— 30
Copper Braziers, 16oz. and over	— @— 30
Copper Nails	35 @— 36
Copper, Old Sheathing, &c., clean	— @— 17
Copper, Chili Pig	— @— —
Copper, American Ingot	19 @— 19¾
Yellow Metal, New Sheating	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1½ cents ₱ lb; Pipe and Sheet, 2¼ cents ₱ lb.

Galena, ₱ 100 lbs	$— — @— —
Spanish (gold)	6 20 @6 25
German, do.	6 20 @6 40
English, do.	6 20 @6 45
Bar (net)	7 70 @— —
Pipe and Sheet (net)	7 70 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent. ad val.

	Gold ₱ lb.
Banca	43 @43½
Straits	— @38
English	35½@—

PLATES.

Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ₱ box	$8 75 @9 —	$10 00 @10 50
I. C. Coke	7 — @7 75	8 25 @ 9 25
Coke Terne	6 — @6 25	7 25 @ 7 75
Charcoal Terne	7 75 @8 25	9 — @ 9 50

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ₱ 100

	Gold.
Plates, Foreign ₱ 100 lbs.	$6 00 @6 25½
Plates, Domestic ₱ lb.	10 @— 11½

REMARKS.

IRON.—The market for Scotch Pig remains inactive, but as there is no improvement in the supply, prices are supported. American meets with little inquiry, and prices are inclined to favor buyers. Wrought Scrap is in moderate request, and we notice sales of 285 tons old on private terms. Rails are in good demand, and sales have been made of 2,000 tons 50 lb. English at $60 gold, and 400 do. 56 lb. on private terms. Old are in demand at $40 gold. Bar continues as last noted—the market is quiet at old rates for lots from store.

COPPER.—Manufactured is steady at the recent reduction in prices, say New Sheathing 30c.; Braziers', over 16 oz., 30c.; 16 oz. and over 12, 33c.; 12 oz. and under, 36c.: and Copper Bolts, 30c. Yellow Metal Sheathing is reduced to 22c., old taken in exchange at 13c.; Yellow Metal Bolts, 23c.; Composition Nails, 22c.; and old Copper, 17c. The principal receivers of Lake Copper are not offering their supplies, and with rather more inquiry from dealers, the market is again a little higher; sales have been made of 150,000 lb. Baltimore at 19@19¼c.; and 200,000 lb. Lake, 19¼c., with small lots at 20c., closing at 19¾@20c.

TIN.—Pig is in moderate demand at sustained prices. Sales have been made of 900 slabs Straits at 37¼c., and 400 do., in lots, 38c.; English, 35¾c. gold. Plates are in fair request, and prices are steady and firm. We notice sales of 550 bxs. Charcoal Tin at $8 75@8 87½ for I C; 1,100 do. I C Coke, part 14 by 20, $7 50@7 62½, and 300 do. Charcoal Terne, $7 75, all gold.

LEAD.—In Pig there has been more business at unchanged prices; the sales are 100 tons saft English at $6 42½@6 45; and 50 do. ordinary Spanish, $6 25, time and interest. Bar, Pipe, and Sheet, are steady at $7 70 ₱ 100 lb., net cash.

SPELTER.—Foreign is entirely neglected, and prices are nominal. Lehigh is steady at 11½c. for best: Missouri 7c., currency.

ZINC.—American Oxide Zinc, 6½@7c.; French do. do., 9½@10c., and Sheet, 9@10c.

MANGANESE—4@4½c.

Mining Stocks.

NEW YORK, June 17, 1870.

A general advance in prices is noticable in our list of quotations publishhd elsewhere. Quartz Hill now brings 25c.; Grass Valley 39c., and Central Gold, 28c. Sales of Central were however made yesterday at 24@26c., while Grass Valley rose to 41c. Casco, a new Stock, sold yesterday, b. 60, at 90c., and Gregory reg. at $1 10. Quicksilver pref. is now offered at 15½c.

The business done in Petroleum Stocks at the Exchange, is meagre, and prices have receded from the advanced quotations of last week. The following is the latest report from the Exchange:—

	Bid.	Asked.
Bennehoff	33	—
Bergen Coal and Oil	40	—
Bliven Oil	40	—
Brevoort	1 00	1 20
Buchanan Farm	45	50
Central	64	70
Home Petroleum	3 50	—
National	25	—
N. Y. & Alleghany	2 00	3 25
Northern Light	60	1 00
Pithole Creek	1 30	1 60
Rathbone	25	40
Rynd Farm	31	32
Second National	—	75
Blood Farm	60	—
United Petroleum Farms	21	23
United States	70	—

San Francisco Stock Market.

Neither our telegraphic or mail advices give any reason for the recent heavy decline in Gould & Curry. We quote it this week at 72½ against our quotation of 120 on the 1st inst. A report from the mines, dated June 2d, says that for the week closing May 30th the ore product was 403 tons, the average assaying value being $44 20 per ton; also that $10,000 has been forwarded to San Francisco. So that we are led to believe that the recent heavy decline must be due to the operations on the Stock Exchange, and not to any unusual difficulties in the mines.

The following report, dated June 14, is the latest received from San Francisco. It shows an advance in some stocks since our last.

Savage	43¾	Gould & Curry	72½
Yellow Jacket	46½	Belcher	8¼
Kentucky	37½	Imperial	39
Chollar Potosi	24	Amador	No sales.

The Slate Trade.

NEW YORK, June 17, 1870.

In spite of the dullness of the season, we note a considerable amount of building going on, which necessarily creates some demand for roofing material. As slate forms by far the largest part of the roofing, in the large cities at least, we of course find a small amount of business going on among the retail men in the slate trade. This naturally keeps the whole trade going, though very slowly, the total quantity changing hands being very limited; but even this should be a matter of encouragement. In many trades an entire suspension has taken place, and it should be a matter of rejoicing to find a little business going on, even though that little is a mere nothing compared with former times. At the Dalles, near Thompson, Minn., are very extensive slate deposits, credited by western report as the largest slate deposit in the world. We take this to mean that the deposits are extensive. From recent advices we learn that they are to be thoroughly worked. This is a step well taken. The West contains large deposits of roofing slate of good color, and admirably adapted for roofing.

[Corrected weekly.]

PRICES OF ROOFING SLATE.

(A "square" represents 100 superficial feet.)

Vermont purple, 1st quality, per square	$9 50@10 50
" green, 1st " "	9 50@10 50
" red, 1st " "	15 00@16 00
" variegated, "	8 5 @ 9 50
Pa. b'k and d'k blue, 1st qual., "	7 00@ 8 00

SHIPMENTS OF SLATE OVER THE LEHIGH VALLEY, AND LEHIGH AND SUSQUEHANNA R. R., AND THE LEHIGH CANAL:

For the week ending June 11, 1870.

LEHIGH VALLEY R. R.

ROOFING SLATE.

Jones & Williams	175 squares.
Lehigh Slate Co	105 "
Saylor & Morgan	35 "
Kuntz & Woodring	175 "
Girard Slate Co	.. "
D. Thomas	.. "
Blue Mountain Slate Co	.. "
Locke Slate Co	175 "
American "	35 "
D. Williams & Co	70 "
Keystone Slate Co	70 "
Hope " "	70 "
Total	910 "

SCHOOL SLATES.

D. Williams	.. cases.
Lehigh Slate Co	5 "
A. W. Lerch	.. "
Locke Slate Co	.. "

LEHIGH AND SUSQUEHANNA R. R.

ROOFING SLATE.

Eagle Slate Co	70 squares.
Thos. W. Parry	210 "
Heimbach Slate Co	80 "
J. Beck & Co	70 "
Lehigh River Slate Co	.. "
William Chapman	35 "
Mauch Chunk Slate Co	35 "
Total	550 "

MANTELS.

Lehigh Slate Co	12 cases.

LEHIGH CANAL.

ROOFING SLATE.

Heimbach Slate Co	.. squares.

	Week.	Previously.	Total for Year.
L. and S. R. R.	500	1,889	2,389
L. V. R. R.	910	5,575	6,485
Lehigh Canal	..	762	762
Total	1,410	8,226	9,636

Amount of Water Evaporated per Pound of Coal Consumed on our Western Steamboats.

ONE of the most difficult questions to determine, says the Pittsburgh *Review and Price Current*, is the amount of water evaporated per each pound of coal consumed on our Western steamboats. Various calculations have been made at different times by different parties, without reaching a satisfactory result. The closest and most reliable calculation we have seen is that made by Mr. GEORGE H. ATKINSON, Local Inspector for this port. The following is the result:

Steamer Juniata, passenger, 4 93-100 lbs. water per 1 lb. of coal.

Steamer Glendale, 5 4-10 lbs. water per 1 lb. of coal.

Steamer Great Republic,, 6½ lbs. water per 1 lb. of coal.

Steamer City of Evansville, 6¾ lbs. water per 1 lb. of coal.

Towboat V. F. Wilson, 6 28-100 lbs. water per 1 lb. of coal.

Mean rate of evaporation, 5 97-100.

In the above calculation no allowance was made for waste, condensation, etc. Mr. ATKINSON is of the opinion that this is the point to economize; he therefore confined his calculations to the full amount of steam used and wasted.

We may add that in the East it is claimed that the mean rate of evaporation is eleven pounds per one pound of coal, or about double the amount given above.

The Cincinnati Industrial Exposition.

THE general committee of the Chamber of Commerce, Board of Trade, and Ohio Mechanics' Institute of Cincinnati, announce that a grand Industrial Exposition of manufactures, products, and arts, will be held in Cincinnati, commencing Wednesday, September 21, 1870, and continuing until October 15, 1870, to which artisans, manufacturers, inventors, and all engaged in the production of works of art and ingenuity are invited to contribute.

Ample preparations have been made for the exhibition of machinery in operation, for the prominent display of manufactures, works of art, and products; and also for the general convenience of exhibitors.

Arrangements are being made for the cheap transportation of articles for exhibition from all parts of the country, and for their removal from the depots and wharves in this city to the place of exhibition with safety and at low rates.

Circulars containing full and specific information relating to the Exposition, may be obtained by addressing "Cincinnati Industrial Exposition," Cincinnati, Ohio.

Miscellanea.

A PREPARATION of platinum as a substitute for the ordinary amalgam of looking-glasses, is proposed by M. JONGLET. He prepares his platinizing compound by dissolving the metal, in the form of very thin foil, in aqua regia, and evaporating the solution carefully to dryness. The resulting dry chloride is next placed on a triturating marble, and gradually mixed with essential oil of lavender. When four hundred grammes of the latter are incorporated with the platinic chloride, the mixture is placed in a porcelain dish, and left standing for several days, then decanted, and filtered as a flux. For every one hundred grammes of the platinum used in the preparation of the flux, there are added thereto the following: twenty-five grammes litharge, and twenty-five grammes of borate of lead, mixed and triturated together with about ten grammes of essence of lavender; this mixture is next added to the platinizing fluid. After a layer of platinum has been formed upon the glass, it is fixed by burning it in, by placing the glass in peculiarly-constructed muffles.—*Am. Ex. Review.*

THE Gettysburgh (Pa.) *Compiler* says: It is said that a New York party has leased the farm of Mr. JOHN CULLINGS, in Adams County, on Opossum Creek, near Bendersville, and that in the shaft now being sunk they are receiving additional encouragement day after day. Prospecting is also going forward near Mr. HENRY EPPELMAN'S mill, where a small vein of genuine coal has been found. The progress of these searches will be watched with much interest. With coal, in addition to the vast beds of rich iron ore already discovered within our borders, Adams County will take an important leap forward.

Two immense shafts arrived at the Bethlehem depot Tuesday via the North Pennsylvania Railroad, direct from the machine shop, Philadelphia, intended for the gigantic engine at the zinc mines at Friedensville, Pa., said to be the largest machinery erected for pumping water in the world. These shafts each weigh 16,412 pounds, or over sixteen tons the two. It was necessary to use a span of eighteen mules and a wagon of extraordinary size to convey each singly to the place of destination, which was effected without delay or accident.

THE St. Louis *Review* says: A cutlery manufacturing company has just been organized, and are erecting buildings at Belleville, Mo. We shall very soon be able to clip with shears and eat with knives made from the superior Missouri iron, with Illinios coal. The natural concomitant is another establishment for making our now almost valueless and abundant nickel ores into spoons, forks, and other plated ware.

THE Durham furnace property, on the Delaware, which has for some years been used by the Lillie Safe Company for the manufacture of the iron used in their safes, is to be sold by the sheriff of Bucks County, at the suit of Peter Cooper, of New York, who holds a heavy mortgage on it. The property is valued at over $200,000.

THE Excelsior Mining Company of Cincinnati has just been organized with a capital stock of $250,000. The office and business to be located at Cincinnati. The incorporators are JAS. M. WATTERS, SAMUEL WINDHAM, JAS. DAWSON, FRANK SCONFEL, and J. C. BECK.

COPPER has been found in Newfoundland, and a number of mines have recently been opened, one of which yields $320,000 worth of copper annually.

On the Manufacture of Vitriols.

BY A. EILERS, MINING ENGINEER.

V.

ZINC VITRIOL.

ZINC, or white vitriol, (Zn O, SO_3, HO+6 HO) is the neutral sulphate of zinc, and, according to the temperature at which it is crystallized, contains six or seven equivalents of water; in the former case it crystallizes in the shape of right, in the latter in the form of oblique rhombic prisms. Heated to 100 degrees, the common white vitriol loses six parts of water. The last equivalent can only be driven off at higher temperature, and it is difficult to render the salt entirely free from water, without also losing some sulphuric acid. Zinc vitriol dissolves in two and one-third parts of cold, and in a little less than equal parts of boiling water; the solution having acid reaction. It is principally used in the dyeing and printing of calicoes, in varnishes, for medical purposes, and for the manufacture of different zinc salts.

To produce the pure article, metallic zinc in excess is dissolved in dilute sulphuric acid; the solution is filtered, treated with chlorine gas to remove iron and manganese, and, after a small addition of carbonate of zinc, crystallized.

On a large scale, however, the salt is prepared from ores, containing sulphuret of zinc, principally from zincblende. In most cases its manufacture is not the main business of the establishments where it is carried on, but a process by which substances, deleterious to the smelting of ores are removed, while the product leaves at the same time a fair profit over expenses. This is especially the case, where intimately mixed sulphurets of zinc, lead, copper, and iron occur; and, in these cases, the production of a good sulphate of zinc is materially aided by the peculiar relations existing between the formation of the sulphates of the above named metals at different temperatures. I have mentioned these briefly in a former article, as far as iron and copper sulphates are concerned, and I need only add here, that sulphate of zinc is formed at a higher temperature than either of the two others, and is much harder to decompose. But, as in establishments of the kind alluded to, too great an expense in the roasting operations is avoided for economic reasons; the advantage offered by nature is frequently lost to a great extent in the roasting of the ores in heaps, where neither the temperature, nor the access of oxygen are sufficiently in the control of man, to permit such regulation, as would be required to produce the greatest amount of sulphate of zinc and the smallest quantity of other salts.

A description of the process of manufacturing zinc-vitriol, as carried out on a large scale at several works near the old mines of the Rammelsberg, in the Hartz mountains, Germany, will best illustrate the subject and as the same can be employed to advantage without much alteration also in this country, where similar ores occur not too far from market, this article may, I hope, contribute a little towards reviving some of those mines, which, carrying galena and blende very finely mixed, have been shut down, because it was found too difficult to smelt the ores to advantage. If by the following process, or one similar to it, not all the zinc can be extracted from the ore, it is certainly within our reach to remove, at least, so much that the remainder will not interfere with a profitable smelting process for the beneficiation of the lead, and the silver possibly present.

At "Herzog Julius Hütte," near Astfeld, ores from the Rammelsberg mines are used for the manufacture of zinc vitriol. Those ores are selected for this purpose which contain an intimate mixture of zincblende and galena, and small quantities of sulphurets of iron and copper. They are roasted in heaps in the open air, and present after the first roasting an intimate mixture of sulphates, (most of which are soluble in water,) oxides, undecomposed sulphurets, and earthy gangue. The soluble sulphate, present in the greatest quantity, is that of zinc; the sulphates of copper, iron, manganese, magnesia, and lime, are present in subordinate quantities, because they have been mostly decomposed by the high temperature which was necessary to form the zinc vitriol. The fine ore, from the third roast fire, is also used, and yields a better zinc vitriol than that from the first, since it contains less of the other sulphates.

The ore is lixiviated in wooden tubs with double bottoms, having a capacity of 216 cubic feet. The tubs are first partly filled with water, and the ore is introduced hot from the roast-floors and left in contact with the water for twenty-four hours. The solution is successively drawn over into two other tubs, which both contain roasted ore; and after the third lixiviation the liquor has generally become concentrated enough to be run into the two settling reservoirs below. Each of these has the same capacity as the lixiviating tubs. The leaching process is continuous, one tub being filled with fresh water every day, and the concentrated liquor emptied from another one. The slimes from the settling vessels are allowed to run out through a separate gutter into the slime-pits. After the leaching, the coarse ore is taken out with iron shovels, and dried over wood fires in the winter and in the open air in the summer. It then passes into the second and third roast fires to fit it for smelting.

The solution is next pumped over into a square, leaden pan, in which it is quickly heated up to about 203 degrees Fahrenheit. The temperature is then lowered and maintained for a while. The object of this process is the precipitation of the sulphate of iron and manganese as basic salts; and when no more of these salts separate themselves from the solution, the heating is stopped and the liquor left to cool. It is important to maintain a certain temperature (about 145 degrees Fahrenheit) in this process, because too high, or too low a degree of heat, ultimately causes sulphate of zinc to crystallize out, and become mixed with the basic salts. The high heat concentrates the solution too rapidly, causing the zinc salt to be precipitated, even at the high temperature which would otherwise keep it in solution. Insufficient heating, on the other hand, allows the temperature to fall so far as to throw down the zinc salt.

From the leaden heating vessel the solution is allowed to run into the settling tanks, where it becomes clear in sixteen to twenty days. It is then drawn off from the sediment into the final concentration pan, where it is heated together with the mother liquor of the preceding campaign until it shows at a temperature of 219 degrees Fahrenheit, a specific gravity of 51 degrees Beaumé. It is then transferred to a cooling vessel, and after eight to ten hours, when the temperature has sunk to 158 degrees Fahrenheit, the crystallization vessels, similar to those mentioned in former articles, are filled with the concentrated liquor. The cooling vessel is lined with lead; the crystallization tanks are not lined; and for this reason the hot solution cannot be at once transferred from the heating pan into the latter, because it would dissolve the zinc vitriol, which under ordinary circumstances closes the seams in the wooden vessels effectually, and leakage would result. As the product is subsequently calcined, the size and beauty of the crystals is of no importance; and they are allowed to form along the sides and on the bottom of the vessels. After 12 to 14 degrees, the crystallization is usually at an end. The mother liquor is then run out of holes in the bottom and conducted into a tank, where it is saved for further concentration in a subsequent campaign. It is used over and over again, until it assumes finally from the concentration of iron and copper salts, a dark green color, when the copper is precipitated out of it by means of metallic zinc and the solution given back into the vitriol process.

According to WITTSTEIN and B. ILLING, the different crystallized zinc vitriols from these works, contain:

	WITTSTEIN.	ILLING.
Zn O	15.00	24.11
Fe O	0.30	1.25
Mn O	3.24	3.48
Cu O	— —	1.47
Mg O	5.10	trace
SO_3	29 04	29 02
HO	47 00	41 37

The crystallized zinc vitriol is heated, in order to remove part of the water of crystallization, in a copper kettle of about twenty-eight cubic feet contents. For this purpose it is introduced into the kettle in small quantities at a time, and fused in its own water. It has to be stirred continually, and the temperature must be low, to advoid the adheving of the scum to the sides of the vessel. When heated sufficiently, the liquid mass is ladled into three large cooling troughs, where it is stirred continually to accelerate cooling and avoid the formation of lumps. As soon as the mass has assumed a past consistency, it is transferred to platforms where it is stirred and turned until cold, and until it becomes a granular mass, similar to dry white sugar. It is then sifted through a sieve with eight holes per square inch; the separated lumps go back into a new charge in the kettle, and the sifted part is pressed into loaf-form and packed in barrels, holding seven to eight hundred pounds. The calcining operation is generally effected once in a fortnight, and about twenty thousand pounds are submitted to it at one time.

According to B. ILLING, the calcined zinc vitriol contains: Zn O. 31.37; Fe O. 1.89; Cu O. 1.09; Mn O. 4.25; SO_3. 31.06; HO. 31.00.

Eighteen hundred pounds of crystallized vitriol yield sixteen hundred pounds of the calcined article of commerce. Besides the ores themselves, the bottoms of the roasting floors are also used for the manufacture of zinc vitriol. In these the sulphates accumulate in time, to such an extent, that sometimes more than 100,000 pounds of vitriol have been extracted from them at a single cleaning.

The Gold Deposits of the Southern States.

By WILLARD P. WARD, M. E.

THE existence of auriferous deposits in the States of Virginia, North and South Carolina, Georgia, and Alabama, has long been known. Many attempts have been made to work them in different places and at different times.

As long ago as 1833-35, before the Indians had been removed from the "Cherokee country," which embraces the northern part of Georgia, the western portion of North Carolina and parts of the States of Alabama and Tennessee, considerable money was made in a small way, by working the beds of the small streams which abound in that section; and later the work was extended to the beds of the Chestatee, Etowah, and Chatahoochie rivers.

The results of this work are, of course, considerably exaggerated by the old inhabitants; and, at this time, it would be exceedingly difficult to ascertain, even approximately, the actual profit to the parties who carried on these undertakings.

As a large amount of the manual labor was performed by slaves, during the winter months, when there was but little, if any other employment to be found for them by their masters, the item of labor, which is usually so large upon the books of any mining company, either was not taken into account at all or was placed at a very low figure.

In short, the exhibits of expense, whenever made, are taken from particularly favorable places, or made at remarkably favorable times; accurately kept books being unknown. Hence the figures given, must be received with extreme caution; and to make a general tabulated statement of the expenses and returns, would be impossible.

The returns of the Charlotte and Dahlonega branch-mints show the amount of gold that was sent to them, but as a considerable quantity was diverted into other channels, even those tables are very incomplete. According to these, however, up to the year 1867, the States produced as follows:

Virginia	$1,580,388 72
North Carolina	9,344,933 29
South Carolina	1,354,864 52
Georgia	7,000,439 70
Alabama	202,172 13

At least two-thirds of which was from what is there termed "branch mining," and in California "placer-mining." Average fineness 928; in California, 875—900.

The apparatus used in this kind of work consisted of "pans," "rockers," "toms," "riffles," and sometimes small "drag-mills" or arrastras, to prepare the ore for the rockers.

Since the close of the war, and chiefly owing to the cheapness of labor at the South, in comparison with the West, attempts have been made, by Northern men or companies, to work the veins from which this placer-gold was derived.

These enterprises, with one or two exceptions, have failed, in some cases, because the ore was of too low a grade, and sometimes, because there was not enough ore to supply the mills. The Dorn mine in South Carolina is the most marked exception to the general fiasco.

The so-called veins, on which the greater part of this work has been done, I do not regard as true fissure veins at all, on account of two marked characteristics which are in direct antagonism to the very definition of true veins. 1st. They lie in the plane of the stratification and even conform to the wave-like contortions of the old presilurian slates. 2nd. They are not continuous in any direction, either longitudinally or vertically, but are composed of lenticular masses or bean-shaped deposits, called in German, "Linsen." Frequently several of these lenticular masses are found between the same strata of the slate without any connection of gangue whatever, between any two of them.

The plainest illustration of this that I ever observed was at a mine near Ackworth, in Georgia, where a shaft was commenced upon a narrow and exceedingly rich mass. In sinking, the deposit was found to increase in thickness to the depth of thirty feet, when it commenced to grow narrower again, and at the depth of fifty feet, as the Georgia miners said, it "pointed out," or disappeared entirely. In the meantime, at a depth of thirty feet, a level had been commenced and driven both ways from the shaft. Within fifty feet of the shaft in one direction, and twenty-five in the other, the vein "pointed out" again. Afterwards, the precise shape of the whole lenticular mass, was shown by its being entirely worked out. The shaft was continued to the depth of one hundred feet, and passed through another mass, smaller than the first.

The uncertainty of a continued supply of ore, has led the Dahlonega miners always to combine vein work with either placer or hydraulic mining.

In this way, under favorable circumstances, they can usually make a profit at all times, which is a very important thing to all mining companies, as they usually object to a large surplus being kept on hand undivided, and also to returning any part of their dividends in assessments.

Though a mining company can be started with much less capital, and run with much less expense at the South than in the Territories, the risk of losing whatever is put in is much greater; and the chance of very large returns is very small.

This statement, derived from general observation, and from a knowledge of the results of many mining companies and private enterprises, may be relied upon as not unnecessarily discouraging to speculators and capitalists.

Comparison of the Bessemer and Heaton Processes in Making Steel.

M. SCHINZ has instituted comparative experiments upon the two most celebrated processes for the manufacture of steel. Strictly speaking, both have but one thing in common, and that is that the necessary re-agents for refining the crude iron are more practically and economically introduced than formerly by old methods. But while BESSEMER uses the air directly for oxidation, HEATON employs Chili saltpetre, which he permits to act upon the crude iron. If it be said that the Bessemer process has the advantage over the Heaton in the fact that the oxidizing agent, the air, costs nothing, there is liability to err, as the re-agent is not the oxygen of the air, but in fact of the oxides of iron that are formed at the expense of the cast-iron. As the Bessemer process is only available in the case of pure iron, which commands high price, and as the loss is calculated at one-fourth, the re-agent actually costs more than would come into account in the ordinary puddling furnace. On the other hand. the Bessemer process yields an easily fusible product, which can be cast at once, whereas the Heaton iron must be re-cast before it is ready for use. The Heaton process has the advantage in making very inferior ores available, which more than compensates for the cost of the Chili saltpetre; it has, however, not been thoroughly tried, and hence any decision upon its comparative value would be premature; it also does not come into competition with the Bessemer process, as its chief claim is to use inferior sorts of iron not workable by BESSEMER'S method.—*Journal of Applied Chemistry.*

Singular Upheaval of a Village.

AT the last sitting of the French Academy of Sciences a letter was read, dated Madrid, 18th inst., from M. DE BOTELLA, mentioning two singular instances of upheaval of the soil. In 1847 an observer stationed on the top of the church steeple of the village of Villar-Don-Diego, in the province of Zamora, could just perceive the weather-cock of that of Benifarzes, situated in the province of Valladolid. At present fully one-half of its steeple is visible. A similar phenomenon has been observed in the province of Alva, at Salvatierre, whence the whole of the village of Salduende may now be perceived, whereas in 1847 it was almost entirely concealed from view. The four points mentioned lie on a line passing through Burgos, and nearly parallel to the Sancerre geological system. A distance of three hundred kilometres extends between the extreme points. The perpetual secretary, M. ELIE DE BEAUMONT, here remarked that similar facts had been observed in Wurtemburg a few years ago, and added that, if it were once admitted that such phenomena were not mere illusions, there would probably be more on record.—*Colliery Guardian.*

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., Editor,

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The Inter-Oceanic Ship Canal.

AT the regular meeting of the American Society of Civil Engineers, held at its rooms, February 16, 1870, on motion of General GEORGE S. GREENE, a committee of seven was appointed, consisting of ALFRED W. CRAVEN, President of the Society, Col. JULIUS W. ADAMS, Vice-President, ALFRED P. BOLLER, Secretary, General J. G. BARNARD, Engineer Corps, U. S. A., STEPHEN CHESTER, THEODORE WESTON, and JOHN C. CAMPBELL, with instructions to gather information as to the most feasible route for a ship canal across the American Isthmus.

It will be noticed that the duty of this committee was limited to the collection of information. It was not authorized to make a report, embodying any opinion, but merely to prepare the data upon which the Society itself could base a discussion of the question. Whether it was supposed that the members of the committee as constituted could not agree on such a report in favor of any one route, and for this reason were not required to unite upon one, we do not undertake to say; but we happen to know that the committee availed itself of a strict construction of the resolution creating it, and merely parcelled out to certain of its members the duty of procuring all available information concerning different routes.

Col. JULIUS W. ADAMS, being already in the employ of the Tehuantepec Company, very naturally received that route as his subject. To this we do not object. As the engineer of the route, he probably knows more about it than any one else, though it may be questioned whether that relation greatly favors the formation of a perfectly independent judgment. Be this as it may, Col. ADAMS read a paper on the subject at the meeting of the Society held March 16, 1870, which begins by declaring that the committee "have been selected for their personal knowledge of the localities upon which they will severally report," and which should continue, one would naturally expect, with a careful statement concerning the Tehuantepec route, of which the author has "personal knowledge." We were somewhat surprised, therefore, to find in this paper, representing only the individual contribution of one person, on one department of the subject, the tone of a partisan report, summing up the whole matter in advance, and treating almost everything but the Tehuantepec line, which is dismissed with a grand description of its alleged advantages, such as would be called, if it emanated from anybody but a distinguished engineer, nothing more nor less than a puff.

After the reading of this paper, the Society passed a resolution, expressing the hope that a survey of the Tehuantepec route may be made, before the patronage and influence of the government and the capital of its citizens is committed to any other. To this recommendation, there is, of course, no objection. The more we know of the various passes and waterways, before we commit ourselves to any particular line, the better.

But Mr. STEVENS, the President of the Tehuantepec Railroad Company, has published the paper of Col. ADAMS under the regular heading of the Society, and as a part of its Transactions. This is contrary to the practice of the Society, and constitutes either an unwarrantable liberty, or a piece of favoritism. We have always believed the policy of this distinguished association, in keeping its transactions secret, except to its own members, to be short-sighted and unwise. Our opinion in that respect will scarcely be altered, if it is to be understood that while papers of *merely* scientific and professional interest are strictly withheld from publication, such as are calculated to influence Congress or assist particular schemes with the public, are to be allowed to leak into unauthorized circulation.

A St. Louis periodical, misled by the specious form of Mr. STEVENS' circular, quotes largely from Col. ADAMS' report, and pronounces it to be the verdict of the whole committee. This is disclaimed by the author himself; but the passage in which he disclaims it is *not* quoted; and the names of the committee, as we have given them above, are all mentioned, with the exception, curiously enough, of that of Col. ADAMS himself! We repeat, that this ingeniously unfortunate misconception, by which everybody except the author is made responsible for an *ex-parte* opinion, is not the fault of the Society, or of its illustrious Vice-President; but it may serve to show these gentlemen that an official publication in engineering journals of their actual transactions would protect them from garbled versions, affecting directly their individual standing.

In a recent instance, THE ENGINEERING AND MINING JOURNAL requested permission to publish a highly valuable paper by a member of the Society, and was refused, on the ground that the rules forbid such a course. Shortly after, the same paper was published by another periodical, the proprietor of which obtained it from the Society's printer. We understand that in that case the sinner was mildly blamed. For our own part, we should be glad to give our readers the benefit of all the contributions to engineering science made by this eminent body of engineers; but we prefer to obtain them in a straightforward way.

The members of the committee on the Inter-oceanic Canal will doubtless continue to present papers, embodying the facts with regard to each of the routes proposed, and alleged to be feasible. Col. ADAMS' paper having been made public, we shall not hesitate to follow it with such others as seem to us instructive. In the present number, we present the paper of Mr. JOHN C. CAMPBELL, First Assistant Engineer of the Department of Public Works in this city.

Mr. CAMPBELL's report has reference to the Panama route; and the figures it contains proves, what we have already repeatedly asserted, that this line is quite feasible for a canal, capable of passing the largest ships. Of the three estimates it contains, the second seems to us the most suitable. It gives us for the sum of $158,610,000 a canal *thirty feet deep*, with a summit forty-five feet above mean tide-level. The data are both more full and more trustworthy than those heretofore furnished for any other line. The great experience *in that locality* of Col. TOTTEN, who furnished them, gives much weight to them; and the existence of a railroad in active operation alongside makes it possible to reckon accurately the cost of the canal-works, and to keep it within the estimates. The liability of exceeding the originally-proposed expenditure on such constructions in entirely isolated regions is great indeed, as the building of the Panama railroad itself abundantly shows. Any new line away from that road would have to go through the same severe lesson; and we think it would be easier to raise capital, and safer to invest it, in the construction of a line which would certainly not cost more than the large sum named, than in the construction of one which promised at the outset to cost less, but was liable to exceed the mark through a hundred unforeseen circumstances.

So far as the discussion has gone, we agree with Mr. CAMPBELL in favoring the Panama route; but as we have no private schemes to advance, we shall not publish his opinion as the report of the committee of which he is a member. It is merely his contribution—a most valuable one—to the general stock of our information on the subject. By all means, let us have more surveys, and as much light on the subject as possible. THE ENGINEERING AND MINING JOURNAL will attempt to be candid and fair in the matter; but it can scarcely remain neutral, so long as it remains our deliberate judgment that the line selected by the shrewd managers of the Panama Railroad, after long and careful search, as the most suitable for a railroad, will remain the best that can be found for a ship-canal of adequate dimensions.

Our Sea Coast Defences.

PERHAPS no subject of vital importance to the nation is so little understood or studied by our people as the defence of our seaboard. Having had the education of a great war, we are by no means ignorant of general military subjects; but, strange as the assertion may appear to the casual reader, the war has added little to our knowledge of harbor defence; and the opinions of most people amount to no more than a general distrust of our system of permanent fortification, and a hazy idea that the true solution of the knotty problem lies in the provision of numerous "monitors" and ships of war.

The system of defence as elaborated in the masterly reports of the late eminent Chief of the Corps of Engineers, General TOTTEN, and in the reports of the various Boards of Engineers and officers of the corps, when regarded in the light of the times in which they were prepared, leave nothing to be desired; but the recent great improvements in artillery and vessels of war, and also in auxiliary means of defence, have introduced so many new conditions into the problem that, although we do not believe the fundamental principles of the system will be affected, it seems as though the subject will have to be studied from the beginning anew.

We regard therefore as timely the appearance of a report of the United States Board of Engineers for Fortifications, made last year to the Chief of Engineers, discussing the general subject of harbor-defence, giving in a condensed form the results of their experiments and the conclusions which they base thereon. The report will be found on another page.

The examination and study of this important subject could scarcely have been placed in abler hands. Generals BARNARD and CULLUM stand as high in reputation as military writers and engineers as they do in rank, and Generals TOWER and WRIGHT, in addition to the reputation which they have acquired as able and experienced officers of the corps, have distinguished themselves as commanders in the field. From a board so constituted we have a right to expect much, and this able preliminary report shows that we are not likely to be disappointed.

An examination of the general conclusions of the board will show clearly the character of the change which has taken place. The elements of the system—ships, forts, auxiliary defences—remain; the change is in the relative importance of these elements in the defence. The improvements in speed of vessels of war, which increases the chances of *running* batteries and removes vessels quickly from positions under the fire of forts, has called for and produced corresponding improvements in torpedoes and floating obstructions; so that these auxiliaries have acquired a relative importance which was never given them under the old system. The failure to devise, up to the present time, a satisfactory scarp for casemate works has compelled the employment, wherever practicable, of earthen batteries, and will probably increase the importance of floating batteries and rams as an element of the defence.

We can scarcely agree with the opinion of the board that "the adoption of heavier guns will render a less number necessary for the defence of any given point." The increase of weight both of guns and ammunition, and the increase in the speed of ships, must certainly diminish the rapidity and accuracy of fire, and we see no way of meeting this difficulty other than by increasing the number of guns.

We are glad to see, by the letters of the Chief of Engineers accompanying the report, that the board are directed to continue their investigations, and we hope at some future time to be further instructed by their reports upon the important subject of national defence.

Statistics of Blast Furnaces.

PROF. T. EGLESTON, Jr., of the School of Mines of Columbia College, has published a small pamphlet, giving the results of the collection of statistics from the iron blast-furnaces of the United States. The tables are very unsatisfactory, on account of the imperfection of the returns from the iron-masters, most of whom seem wholly indifferent to all attempts of this kind to benefit their business. From the present publication we are able only to gather the range of each dimension and condition in each State. Thus we may learn that in Connecticut the total height of a charcoal furnace varies from 7.315 to 10.055 metres, and similar minima and maxima are given for the height of bosh, height of hearth, height of tuyeres, diameter of throat, diameter of bosh, etc., etc., production in twenty-four hours, number of cubic metres of furnace for each ton of iron produced, number of tons of iron per metre of bosh, number of tuyeres, temperature and pressure of blast, kind and yield of ore, kind of iron, and quantity of fuel per ton of cast-iron. As the tables do not give the number of furnaces in each State from which returns were received, the comprehensive nature of these statements is not made clear; and as it is impossible to deduce from such an arrangement of them any conclusions whatever concerning the effect on production, economy, or quality of iron, excited by given dimensions, or combinations of dimensions (since there is no way of finding out, except for States from which, apparently, only a single furnace has been reported, the figures which belong together) we are forced to the conclusion that this is not intended by Prof. EGLESTON as in any sense a contribution to science, but only as an appeal to American iron-masters for further assistance. It is merely an announcement that he has accumulated a certain quantity of statistics, large, but not sufficient for his ultimate purpose, and that he desires to obtain more. In this undertaking we wish him success with all our heart, and we call upon iron-masters to furnish to him the data which will complete the important work he has in hand. A thorough discussion of the statistics indicated, but not given, in this preliminary publication, would be a great service to the profession; and we hope Professor EGLESTON's industry and perseverance will not fall short of that goal.

The Freezing of Water in Pipes Laid under Rivers, etc.

SOME time since we called the attention of our readers to an invention of Mr. JOHN F. WARD, Superintendent of the Jersey City Water-works, for laying pipes under rivers, bays, and other bodies of water. Since that time, he and his partner, Mr. CRAVEN, formerly of the Croton Water-works, have undertaken and completed satisfactorily several contracts for this kind of work.

During the cold weather of last winter, it was found in one or two instances that these pipes, though laid in from twenty to thirty feet of salt water, froze up almost or quite solid, while the water over them was not frozen at all. Strange as this statement may appear at first glance, the phenomenon can be easily accounted for.

Water, containing in solution as much salt as is usually found in our salt rivers and bays, acquires its greatest density at from 28° to 30° F., at which temperature, however, it does not freeze, but will, by virtue of its greater specific gravity, sink to the bed of the river, and surround the pipes. Thus, after a few days of extreme cold weather, we would find the pipes immersed in a body of water two or three degrees below the freezing point of fresh water, which, owing to its superior conducting property, would very soon freeze the water in the pipes unless a constant and rapid current was kept running through them. This property of salt water, which has long been known, and which operates so favorably to navigation in

high latitudes, is in this instance the cause of serious inconvenience. Mr. WARD has, however, a plan for obviating this difficulty, which he proposes to patent, and which we will publish as soon as his arrangements are completed.

A New Preventive against Lead Poisoning.

FOR the benefit of those of our readers who are exposed to that dreadful malady, lead-colic, we give in the following a very simple remedy, as proposed in a recent publication by M. DIDIERJEAN. It is well known that heretofore the eating of fatty substances has been quite extensively practised by the workmen in lead-smelting works, white-lead manufactories, etc., as the best preventive known, and that this means, though effective in many cases, could not be considered as absolutely safe. M. DIDIERJEAN, who is a manufacturer of red-lead, proposes now *milk* as an absolutely safe and effective antidote against sickness resulting from the inhalation of lead-poison. He states that formerly, although he took all known precautions to keep his workmen in a healthy state, he could not succeed in preventing lead-colic altogether. He found, however, that two of his workmen were never in the least affected, and on inquiry he was informed that these men were in the habit of drinking milk regularly on taking their meals in the factory. He made it, therefore, obligatory on his employees to drink at least one liter of milk per day, and by proper surveillance he has succeeded during eighteen months in keeping all his workmen perfectly free from lead-disease. We are aware that it may be rather difficult for Nevada furnace men to follow these directions, as cows are supposed to be quite a scarce article in some parts of that alkaline country, but our Eastern friends at least may be induced to try this cheap experiment.

The Origin of the Alkalies Contained in Soluble Glass.

By Dr. L. FEUCHTWANGER.

THE two alkalies employed in the manufacture of silicate are potash and soda, the oxides of the metals potassium and sodium; both of which were discovered in 1807 by Sir HUMPHREY DAVY. They were decomposed by him by means of a powerful galvanic current. Before that time all alkalies and alkaline earths were supposed to be elementary bodies. The metals have since been prepared by heating in an iron retort either the potash or soda, with charcoal, at a high temperature. By this process, the carbon, at the high temperature, is able to take the oxygen from the potash or soda, forming a carbon monoxide, which escapes as a gas, while the metal, either potassium or sodium, being volatile at a red heat, distills over. The preparation of these metals is attended with many difficulties, and requires special precautions, as the vapors of these metals not only take fire when brought in contact with the air, but decompose water, combining with the oxygen, and liberating hydrogen; hence the metallic vapors must be cooled with naphtha or petroleum, which do not contain any oxygen. It is indispensably necessary to distill the metals a second time for purifying them and freeing them from a black explosive compound, which invariably forms in the original preparation, and has caused several fatal accidents.

POTASSIUM.—Is a bright, silver white metal, which can easily be cut with a knife at the ordinary temperature, is brittle at 0°, melts at 62°.5 Fahrenheit, and does not become pasty before melting. When heated to a temperature somewhat below red heat, potassium sublimes, yielding a fine, green-colored vapor. This metal rapidly absorbs oxygen, when exposed to the air, and becomes converted into a white oxide. Thrown into water, one atom of potassium displaces one of hydrogen from the water, forming potassium hydroxide, or potash. This takes place with such force, that the heat developed is sufficient to ignite the hydrogen thus set free, and the flame becomes tinged with the peculiar purple that is characteristic of the potassa compounds, whilst the water attains an alkaline reaction from the potash which is formed. Potassium also combines directly with chlorine, sulphur, and many other non-metals, evolving heat and light.

The original source of potassium compounds is the felspar of the granitic rocks, containing from ten to twelve per cent., and mica, containing from five to six per cent. of potash. Up to the present time this source has not been used for the manufacture of the potassium salts, for the reason that no cheap and easy mode has yet been made available for separating the potash from the silicic acid, with which it is combined in felspar and mica. The grand natural source from which the supply of potash is obtained is the ashes of wood and other vegetable matter. The potassium exists in the plants previous to combustion, having been absorbed by them from the soils in which they grow; the soils obtain the potash from the decomposition of rocks, clay, etc. It is also found, combined with other substances, in sea water. Potash is now generally obtained from the ashes of plants, from which it is leached out, or by filtering water through them and boiling down the clear liquid, which, on evaporation, produces the crude potash, which is then purified. It used to be manufactured to a great extent in the States of New York, Ohio and Michigan, and was called pearl ash, and when perfectly refined, pearl or pot tartar. Some of the other potassium salts, such as the nitrate and chloride, are found in large quantities in various localities as deposits on the surface, or in the interior of the earth. The sources of nitrate of potash, or saltpetre, have been sufficiently well known. The chloride of potassium occurs in beds, together with rock salt, in Stassfurth, near Halle, in Prussia, in considerable quantities, and is largely employed by gunpowder manufacturers for the conversion of nitrate of soda into that of potash. There have been already described thirteen varieties, all containing the chloride with the salt. The utilization of sea water for the extraction of potash salts is about to be tried in Europe on a large scale. All potassium salts are soluble in water, and impart a violet color to flame. The spectrum of this flame is distinguished by two bright lines, one red, and one violet.

SODIUM.—This metal resembles in external appearance the metal potassium. It is, however, procured more easily than the latter, by reducing the carbonate of soda in the presence of carbon. It is now manufactured in large quantities for the preparation of other metals, especially magnesium and aluminum, as potassium was formerly used for the same purpose. The metal distills over, and is condensed in petroleum. It is a silver-white metal, soft at ordinary temperature, melting at 95.6° and volatilizing below a red heat. When thrown upon water it floats and rapidly decomposes the same with disengagement of hydrogen, soda being formed. If the water be hot, or be thickened with starch, the globule of the metal becomes so much heated as to enable the hydrogen to take fire.

THE COMPOUNDS OF SODIUM are very widely diffused, being contained in enormous quantities in the primitive granitic rocks. They are readily obtained from sea-water, which contains nearly three per cent. of chloride of sodium or the common salt of the kitchen. There are large deposits of salt in Galicia, Prussia, England, and this country, (as is the case in Louisiana and Nevada and on the island of San Domingo) and it was formerly obtained from the ashes of sea plants, or kelp, in the same manner as potash was prepared from land plants. At present, however, the carbonate of soda is manufactured on an enormously large scale from the sea-salt, especially in England, and is known in commerce as soda-ash, which is indispensable in glass-making, soap-manufacture, bleaching, and for various other purposes in the arts. No less than two hundred thousand tons of salt are annually consumed in the alkali works of Great Britain.

Soda-ash is prepared from sea-salt by a series of chemical operations, such as that of the production of the sulphate or salt-cake, and the reduction of that to soda-ash. The first is obtained by heating oil of vitriol with common salt, in a reverberatory furnace, whereby the sodium is separated from the chlorine with which it is combined, and unites with oxygen and sulphuric acid to form sulphate of soda, or anhydrous glauber salt. The liberated chlorine combines with the hydrogen of the water contained in the sulphuric acid, to form hydrochloric acid, which is collected as a commercial article. The sulphate of soda then undergoes the second process of pulverizing the same (salt-cake) and heating it with pulverized chalk and charcoal. The product is called black-ash. By lixiviation and evaporating down the solution (the heated air passing over a leaden pan containing the liquid) and calcining afterwards the residue, the soda-ash of commerce is obtained. It contains from forty-eight to fifty-six per cent. of pure caustic soda, combined as carbonate and hydrate, the remainder being impurities, consisting generally of sulphate, sulphite and chloride. If soda-ash be dissolved and the saturated solution allowed to stand, large transparent crystals of the hydrated carbonate, known as soda crystals, are obtained. These are used to soften water for washing purposes.

Carbonate of soda also occurs in certain localities as an efflorescence on the soil and in the beds of dried up lakes.

American Society of Civil Engineers—Annual Convention.

THE second annual Convention of the American Society of Civil Engineers was held Wedesday, June 15, at the Chamber of Commerce. The present officers are: ALFRED W. CRAVEN, President; A. P. BOLLER, Secretary; and JAMES O. MORSE, Treasurer. Over fifty gentlemen were present—among them General BARNARD, Colonel ADAMS, of Brooklyn; HORATIO ALLEN, J. D. STEEL, of Pennsylvania; W. J. MCALPINE, and W. E. WORTHEN.

After some ordinary business had been disposed of, the President reviewed the immense strides the Society had made within the last three years. Established in 1852, it struggled for a few years, in spite of drawbacks, till it died a natural death in 1856. In 1867, a dozen of the old members reorganized it on a new basis, and since then its progress has been remarkable—one hundred and seventy-nine members are now on the roll, and comprise nearly every engineer of note in the States; its library is so extensive that the book-cases will not hold the works, while the papers read are of great importance, and their publications are sought after by every kindred society here and in Europe. There are fifty-two subscribers to the fellowship fund to aid in the publication of its papers, including A. A. LOW, W. B. OGDEN, W. H. ASPINWALL, W. G. FARGO, A. S. DIVEN, and J. HOWLAND.

After the President's address, Mr. W. J. MCALPINE read a paper on the "Waves of Translation in Fresh Water," in which were embodied some remarks on the construction of reservoir dams and the causes of leaks in canals.

Mr. F. C. LOWTHORPE made a long address on the "Use of Cast and Wrought Iron in Bridge Construction," and exhibited a diagram of one built by him in 1856, and which was the first of the kind erected in America, and is now standing as solidly as when first built.

Mr. J. W. DUTTON STEEL made some remarks on the "Use of compressed air as a motor," and was of opinion that compressed air would eventually take an important place as a motor. It has been tried in mines in England with such success that one hundred miles of shaft are already under construction, and he trusted that its use as a motor in underground traffic would soon be considered seriously. Its advantage over steam is, under certain conditions, incalculable.

After some remarks by several present, General BARNARD described the "Construction of Fort Tompkins Wharf," and maintained that, in spite of all said to the contrary, the old method was the best.

He was followed by Mr. SQUIRE WHIPPLE, who made a short address on "Iron and Truss Bridges," and, after a well-prepared paper on "The Transmission of Sand by Water from a Caisson," had been read by Mr. COLLINGWOOD, in which he proved conclusively that not only coarse sand but pebbles can be removed from a dam by a current of water, the meeting adjourned.

On Thursday the members of the society, with a number of invited guests, made an excursion to the forts and public works in and about New York harbor.

New Publications.

WE have received the following interesting pamphlets, which we hope to consider more fully hereafter.

THE GOLD YIELD OF NOVA SCOTIA, 1860-1869, by A. HEATHERINGTON. Fourth year. Twentieth Thousand.

NOTES ON IRON AND IRON ORES, by T. STERRY HUNT, LL.D., F. R. S.

REPORT ON THE QUALITY OF THE KEROSENE OIL SOLD IN THE METROPOLITAN DISTRICT, by C. F. CHANDLER, Ph. D.

REPORT ON THE GAS NUISANCE IN NEW YORK, by C. F. CHANDLER, Ph. D.

Dow's Flat.

(1856.)

BY F. BRET HARTE.

Dow's flat. That's its name.
And I reckon that you
Are a stranger? The same?
Well, I thought it was true—
For thar isn't a man on the river as can't spot the place at first view.

It was called after Dow—
Which the same was an ass—
And as to the how
Thet the thing kem to pass—
Jest tie up your hoss to that buckeye, and sit ye down here in the grass:

You see this yer Dow
Hed the worst kind of luck;
He slipped up somehow
On each thing thet he struck.
Why, ef he'd a' straddled thet fence-rail the dern'd thing 'ed get up and buck.

He mined on the bar
Till he couldn't pay rates;
He was smashed by a car
When he tunneled with BATES;
And right on the top of his trouble kem his wife and five kids from the States.

It was rough—mighty rough;
But the boys they stood by,
And they brought him the stuff
For a house, on the sly;
And the old woman—well, she did washing, and took on when no one was nigh.

But this yer luck of Dow's
Was so powerful mean
That the spring near his house
Dried right up on the green.
And he sunk forty feet down for water, but nary a drop to be seen.

Then the bar petered out,
And the boys wouldn't stay;
And the chills got about
And his wife fell away;
But Dow, in his well, kept a peggin' in his usual ridikilous way.

One day—it was June—
And a year ago, jest—
This Dow kem at noon
To his work like the rest,
With a shovel and pick on his shoulder, and a deringer hid in his breast.

He goes to the well,
And he stands on the brink,
And stops for a spell
Jest to listen and think:
For the sun in his eyes (jest like this, sir!), you see, kinder made the cuss blink.

His two ragged gals
In the gulch were at play,
And a gownd that was Sal's
Kinder flapped on a bay:
Not much for a man to be leavin', but his all—as I've heer'd the folks say.

And—that's a peart hoss
Thet you've got, ain't it now?
What might be her cost?
Eh? O!—Well, then, Dow—
Let's see—well, that forty-foot grave wasn't his, sir, that day, anyhow.

For a blow of his pick
Sorter caved in the side,
And he looked and turned sick,
Then he trembled and cried.
For you see the dern cuss had struck—"Water!"—beg your parding, young man, there you lied!

It was *gold*—in the quartz,
And it ran all alike;
And I reckon five oughts
Was the worth of that strike;
And that house with the cupilow's his'n—which the same isn't bad for a PIKE.

Thet's why it's Dow's Flat;
And the thing of it is
That he kinder got that
Through sheer contrairiness:
For 'twas *water* the derned cuss was seekin', and his luck made him certain to miss.

Thet's so. Thar's your way
To the left of yon tree;
But—a—look h'yur, say?
Won't you come up to tea?
No? Well, then the next time you're passin'; and ask after Dow—and thet's *me*.

[*Overland Monthly* for June.

MINING COMPANIES AND STOCK QUOTATIONS.

GOLD AND SILVER COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
Alameda Silver		A. Queran, 108 Wall st.	$2,000,000	$10 00		
Ada Elmore	South Boise, Idaho					
American Flag	Nevada District, Col	P. P. Fullerton, 71 B'way	600,000	10 00		
Atlantic and Pacific	Humboldt Co., Nevada					
Bates and Baxter	Colorado			50 00	15	1 00
Benton	Colorado	W. F. Drake, 15 Broad	500,000	5 00	02	10
Briggs	Colorado	J. P. Davies, 19 Cliff	1,000,000	100 00		
Black Hawk	Colorado	C.T.Whittington, 48 Broad	2,500,000	100 00	21	39
Bobtail	Colorado	J. Stanton, Jr., 25 Nassau	1,000,000			
Bullion Consolid'ed Gold	Colorado					
Burroughs Gold	Colorado					
Central Gold					28	29
Consolidated Gregory	Colorado				1 10	1 15
Combination Silver	Nevada			100 00		1 50
Columbia Silver	Austin, Nevada	J. M. Brown, 155 B'way	5,000,000			
Commercial Silver		J. E. Smith, 26 Pine	3,000,000			
Corydon	Gilpin Co., Colorado	J. Samuels, 40 B'way	500,000			
Downieville	Colorado		2,500,000	25 00		
Eagle Gold	Gold Dirt Dist., Col	J. P. Davies, 19 Cliff	300,000	1 00		
Empire Gold and Silver	BodieBluff,MonoCo.Cal	H. K. Gates, 70 B'way	1,000,000			
Edgehill		A. Fullerton, 71 B'way	10,000,000			
Esperanza Silver		Ezra Clark, Jr., 13 William	400,000			
Fisk Gold		H. Johnson, 195 Fulton	500,000			
Forest Queen		E. B. Beet, 62 B'way	1,000,000			
Golconda Gold	Sherbrooke, C. E	H. Adams, 71 Broadway	2,000,000			
Gunnell Gold	Colorado	J. H. Rolston, 80 B'way	1,000,000	50 00	15	
Gunnell Central	Colorado	C. B. Bostwick, 16 B'way	3,000,000	10 00		
Gold Rock		R. M. Lockwood, 93 Wall	400,000			
Grass Valley					39	41
International Silver		J. W. Brazier, 26 Pine	600,000			
Hope Gold	Colorado		5,000,000			
Holman			2,000,000	25 00		
Kipp & Buell	Colorado		300,000			
Knickerbocker Gold		J. H. Rolston, 80 B'way	200,000	100 00		
La Crosse Gold	Nevada Dist., Col	P. P. Fullerton, 71 B'way	1,000,000		10	
Lander Hill T. & S	Nevada	M.L.Catherwood,74 B'way	1,000,000			
Lewis Gold	Georgia		1,000,000			
Liberty Gold					01	02
Manhattan Silver	Nevada	M. L. Ogden	400,000			
Maraposa common	California	Jas. H. Ferdon, 34 Wall	12,000,000		7	8½
Mariposa preferred	California	do. do.			16⅛	16½
Montana Gold		G. De Cordova	400,000			
Montana M. L. & M. Co.	Montana	A. M. Hoyt, 22 William	250,000			
Montrose	Clear Creek Co., Cal	W. W. Perkins, 71 B'way	1,000,000			
New York Silver	Nevada	Thos. Sproull, 78 B'way	1,500,000			
New York and Austin	Nevada	E. R. Siccomb, 70 Wall	500,000			
New York and Owyhee	Owyhee Co., Idaho		1,000,000			
New York and Eldorado		G. H. Munroe, 10 Wall	2,000,000		20	
N. Y. & Montana M. & D.	Montana	F. A. Chapman, 20 Nassau	1,250,000			
N. Y. & Silver Peach	Nevada	R. C. Root, 74 B'way	2,000,000			
N. Y. & Utah P. & M		W. H. Mailler, 108 Wall				
Nye						
Ophir Gold	Comstock Lode, Nev	L. C. Warner, 70 B'way	625,000			
Owyhee Gold		W. H. Smith, 43 Ex. Place	1,700,000			
Pahranagat Central	Nevada	J. E. Smith, 25 Pine	6,000,000			
Quartz Hill Gold		F. Bernard	2,500,000		25	27
Reese River Consol'd	Nevada	W. B. Ogden	6,000,000			
Rocky Mountain	Colorado	S. M. Pond, 70 B'way	500,000	10 00		08
Rollins Gold		Thos. Bond, 132 B'way	600,000			
Sensenderfer	Colorado	H. A. Shewill, 19 Broad	1,000,000		1 00	
Silver Bend		F. W. Macy, 20 Nassau	1,500,000			
Silver Mt. Silver		H. A. Moen, 71 B'way	1,000,000			
Silver Peak & R. M	Nevada	W. B. Ogden, 52 Wall	5,000,000			
Smith & Parmelee	Colorado	W. H. Hollister, 6 Broad	2,500,000	20 00	85	99
Social & Steptoe Con		T. H. O'Connor, 24 Nassau	450,000			
Standard Gold		C. B. Bostwick, 169 B'way	500,000			
Symonds Forks						75
Twin River Silver	Nevada	J. F. R. Hadden, 20 Nassau	800,000	100 00		
Texas Gold	Colorado		500,000	10 00		
Union Gold	Colorado	F. A. Potts, 110 B'way	1,200,000			
Wash. Mill & Silver	Nevada	W. W. Perkins, 71 B'way	300,000			
Wauba Yuma	Arizona	J. W. Silsby, 36 Pine	6,000,000			

COAL AND IRON COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Coal Co		M. A. Myers, 119 B'way	$1,500,000	$25 00		
Ashburton Coal Co		J. T. Rollins, 41 Pine	2,500,000			
Block House Coal		D. B. Keeler, Jr., 43 Pine	1,000,000			
Brewster Iron		H. Robison, 165 B'way	150,000			
Broad Top Coal & Iron Co	Pennsylvania	B. Love	2,000,000			
Cameron Coal Co		J. A. Simpson, 40 B'way	2,500,000			
Carbon Hill Coal Co		J. Silsby, 36 Pine	1,000,000			
Central Coal		F. P. White, 111 B'way	2,000,000	100 00		
Clifton Iron Co		P. H. Riordan, 34 Pine	1,250,000			
Columbia Iron		E. D. Webb, 77 Cedar	1,000,000			
Consolidation Coal	Maryland	J. S. Mackie, 71 B'way	5,000,000			
Crawford Coal		E. Clapp, Prest, 137 B'way	1,000,000			
Cumberland C. & I. Co		E. Kissan, 90 B'way	5,000,000		35	39¾
Derby Coal Co		W. S. Davison, 11 Broad				
Dover Coal and Iron Co		L. Chase, 88 Wall				
Del. & Hudson Canal Co		R. H. Nodyne, 7 Nassau	15,000,000	100 00	100	
Ebervale Coal		G.L.Stout, Treas.,111 Br'y	500,000			
Fall River Bituminous		D. T. Blauvelt, 43 Pine	1,000,000			
Farrar Coal		C. H. Jones, 43 Pine	250,000			
Fisher Iron Co		M. Ellis, 19 William	100,000			
Hamp're & Balt. Coal		S. M. Pond, 70 B'way	500,000			
Iron Cliffs Co		C. J. Canda, 52 Wall	1,000,000			
Jackson Iron		G. P. Loyd, 119 B'way	300,000			
Kemble Coal & I. Co		R. A. Wight, 26 Ex. Place	300,000			
Keokuk Coal		J. F. Franklin, 112 B'way	100,000			
Lackawanna I. & C	Pennsylvania	E. C. Lynde, 52 Wall	1,200,000			
Lewis Run C. & I. Co		C. A. Sanborn, 80 B'way	750,000			
Lykens Val. Coal Co		F. A. Platt, 13 William	800,000			
McKean Co. Bit. Coal Co.		J. H. Rolston, 80 B'way	1,500,000			
Lehigh & Susquehanna		E. W. Cark, Philadelphia, Pa.			1 00	
Mahanoy			400,000	100 00		
McNeal C. & I. Co		C. C. Godwin, 71 B'way	500,000			
Mount Riga Iron		G. M. Newton, 42 Cedar	300,000			
New Boston Coal		C. H. Ogden, 55 B'way	2,000,000			
N. Y. Con. C. & I. Co		A. T. Levine, 16 Wall				
N. Y. & Lehigh Coal		T. Simpson, 111 B'way	150,000			
Pacific Coal Co		G. Wrighton, 34 Wall				
Peekskill Iron Co		W. Murdock, 7 Nassau				
Pennsylvania Coal Co		E. H. Mead, 111 B'way	3,200,000	50 00		
Richmond Iron Co		C. H. Smith, 165 B'way	1,000,000			
Scotia Coal Co		C. N. Soper, 42 B'way	2,500,000			
Spring Mt. Coal		J. Runyon, 111 B'way	1,250,000			
Springfield & D'p Run C.		E. D. Webb, 77 Cedar	600,000			
Stout Coal Co		G. S. Comstock, 111 B'way	500,000			
Susquehanna & Wyoming		E. Potter, 40 B'way	1,000,000			
Tannerdale Coal		I. T. Ludlaw, 71 B'way	250,000			
Wash. Mutual Coal		M. C. Baker, 117 B'way	420,000			
West Point Iron Co		R. C. Brock, 110 B'way	500,000			
Wilkesbarre C. & I. Co		W. H. Tillinghast, 80 Br'y	3,400,000			
Wyoming Val. Coal Co		E. Potter, 40 B'way	1,000,000			

COPPER AND LEAD COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED
Anita Copper	California	J. A. Ferguson, 8 Wall				
Corinth Copper	Corinth, Vermont	S. H. Howard, 191 B'way	$500,000	25 00		
Davidson Copper						
Eagle Harbor Copper	Michigan	W. H. Smith, 43 Ex. Place	500,000	25 00		
Evergreen Bluff Copoer	Michigan	F. W. Caper, 44 Ex. Place	500,000	25 00		
Globe Copper		R. K. Rickard, 19 Nassau	200,000			
Grand Portage Copper Co		A. S. Kellogg, 22 Pine	500,000			
Guymard Lead		Samuel Vernor, 38 Pine				
Hilton Copper		W. H. Smith, 43 Ex. Place	500,000			
Hope Copper		J. W. Davis, 19 Nassau	500,000			
Hudson River Copper	New York	T. Clarkson, 22 William	1,500,000			
Indiana Copper Co		J. M. Mills, 25 Nassau	500,000			
Isle Royale Copper	Michigan	F. W. Caper, 44 Ex. Place	1,000,000			
Keweenaw Copper	Michigan	F. W. Caper, 44 Ex. Place	500,000			
Lake Superi'r Silver Lead	Michigan	A. S. Kellogg, 22 Pine	1,000,000			
Omiga Copper	Michigan	S. Cooper, 7 Pine	500,000			
Ridge Copper	Michigan	J. L. Gardiner, Jr., 43 Ex. P.	500,000			
Rockland Copper	Michigan	A. Fullerton, 71 B'way	500,000			
St. Joseph Lead	Michigan	J. W. Jones, 6 Broad st,	1,000,000			
St. Marguret Copper		E. P. Sutton, 43 Pine	250,000			
Schoolcraft Copper		R. Walsh, 22 William	500,000			
Superior Copper	Michigan	A. Fullerton, 71 B'way	500,000			
Union Copper		A. S. Kellogg, 22 Pine	500,000			
Vermont Copper	Vermont	J. C. Ely, 191 B'way	500,000			04
Wallkill Lead, asst		S. M. Pond, 70 B'way				

MISCELLANEOUS.	SITUATION MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Zinc Co		W. E. Lawton, 19 Cliff	$1,000,000			
Bigelow Blue Stone Co		H. Bogardus, 14 Pine				
Quicksilver					7	9
Covill B. L. M. & M'f. Co		C. R. Bostwick, 302 Pearl	250,000			
Manhattan Marble		H. K. Gates, 70 B'way	300,000			
N. Jersey Zinc Co	New Jersey	A. H. Farlin, 61 Malden L'e	1,500,000			

MISCELLANEOUS.

THE BEST TURBINE WHEEL.

SWAIN'S

Gave 5 **Per Cent.** better results at the **Lowell Test** than any of its **Highly Polished Competitors.**

It will give from 30 to 100 per cent. more power, in proportion to its size, than any other wheel.

Guaranteed to give from 10 to 50 per cent. more power, with the same water, than any other wheel in the market. It is the best made, most compact, runs longer without repairs, and gives better satisfaction than any other wheel.

☞ Send for report of tests, with description and diagrams.

SWAIN TURBINE CO.,
June 7:6m **North Chelmsford, Mass.**

DEPARTMENT OF PUBLIC WORKS,
No. 237 BROADWAY.

TO CONTRACTORS.—Proposals inclosed in a sealed envelope, indorsed with the title of the work and the name of the bidder written thereon (also the number of the work as in the advertisement), will be received at this office until Monday, June 27, 1870, at eleven o'clock, A. M.

No. 1. For paving Lafayette place, from Great Jones street to Astor place, with stone blocks.

No. 2. For paving Delancey street, from Bowery to East River, with stone blocks.

No. 3. For paving South street, from Montgomery street to Catherine street, with stone blocks.

No. 4. For paving Second avenue, from Eighty-sixth street to One Hundred and Twenty-fifth street, with stone blocks.

No. 5. For paving Ninth avenue, from Fourteenth street to Twenty-third street, with stone blocks.

No. 6. For paving Eleventh avenue, from Thirty-third street to Thirty-fourth street, with stone blocks.

No. 7. For paving Attorney street, from Division to Rivington street, with stone blocks.

No. 8. For paving Avenue C, from Houston street to Eighteenth street, with stone blocks.

No. 9. For paving Forty-eighth street, from Third avenue to Fifth avenue with stone block.

No. 10. For paving Forsyth street, from Division street to Houston street, with stone blocks.

No. 11. For paving Fifty-third street, from Fifth avenue to Sixth avenue, with stone blocks.

No. 12. For paving Seventy-fourth street, from Third avenue to Avenue A, with stone blocks.

No. 13. For sewer in Fourth avenue, between Fiftieth street and Seventeenth street.

No. 14. For sewer in Fiftieth street, between Broadway and Eighth avenue.

No. 15. For sewer in Avenue A, from Fifty-fourth street to and through Fifty-sixth street to near First avenue.

No. 16. For sewer in First avenue, between Thirty-ninth street and Fortieth street.

No. 17. For sewer in One Hundred and Twenty-first street, between Avenue A and First avenue.

No. 18. For sewer in One Hundred and Twenty-fourth street, between Third avenue and Fourth avenue.

No. 19. For sewer in One Hundred and Twenty-seventh street, between Fifth avenue and Sixth avenue.

No. 20. For sewer in Sixty-seventh and Sixty-eighth streets, between Fourth avenue and Fifth avenue.

No. 21. For sewer in Madison avenue between Seventy-fourth street and Eighty-sixth street.

No. 22. For sewer in One Hundred and Twenty-sixth street, between Third avenue and Fifth avenue.

No. 23. For sewer in Seventy-sixth street, between First avenue and Third avenue.

No. 24. For sewer in Sixty-fifth street, between Fourth and Fifth avenues.

No. 25. For sewer in Madison street, between Pike street and Birmingham street.

No. 26. For sewer in Clinton street, between Houston and Stanton streets.

No. 27. For sewer in Sixty-third street, between Boulevard and Eighth avenue.

No. 28. For sewer in Eighty-first street, between Third and Fourth avenues.

No. 29. For sewer in Sixteenth street, between Ninth avenue and North River.

No. 30. For regulating, grading, curbing, guttering and flagging Bank street, from West street to Hudson street.

No. 31. For flagging Fifty-second street, from Eighth to Ninth avenue.

No. 32. For flagging Tenth street, from Avenue D to East River.

No. 33. For flagging Sixth avenue, from Fiftieth street to Fifty-ninth street.

No. 34. For flagging Forty-fourth street, from Eighth to Ninth avenue.

No. 35. For flagging Fifty-fourth street, from Broadway to Seventh avenue.

No. 36. For flagging Seventy-seventh street, from Third to Fifth avenue.

No. 37. For curbing and flagging Fifth avenue, from Eighty-sixth street to Ninetieth street.

Blank forms of proposals, together with the specifications and agreements, can be obtained at this office.

WILLIAM M. TWEED,
1t Commissioner.

DEPARTMENT OF PUBLIC WORKS.
No. 237 BROADWAY.
NEW YORK, June 8, 1870.

To Plumbers and Masons.—Notice is hereby given to plumbers and masons holding licenses from the late Croton Aqueduct Board that, from and after this date, no permits for tapping water-pipes or for making connections with sewers or drains will be issued unless new bonds are filed with this department.

WM. M. TWEED,
jun21:4t Commissioner of Public Works.

SAWS.

CIRCULAR SAWS WITH EMERSON'S PATENT MOVEABLE TEETH.

These Saws are meeting with unprecedented success, and their great superiority over every other kind, both as to efficiency and economy, is now fully established.

Also,

SON'S PATENT PERFORATED CIRCULAR AND LONG SAWS,

(All Gumming avoided,) and

EMERSON'S PATENT ADJUSTABLE SWAGE,

for Spreading, Sharpening, and Shaping the teeth of all Saws. Price, $5. Manufactured by the

AMERICAN SAW COMPANY

Office No. 2 Jacob St., near Ferry St., New York.
Factory, Trenton, N. J. Branch Office for Pacific Coast, No. 606 Front St., San Francisco, Cal.
Send for new Descriptive Pamphlet and Price List.
july1-1y

PUBLICATIONS.

"THE MANUFACTURER and BUILDER"

AN ILLUSTRATED MAGAZINE OF INDUSTRIAL PROGRESS.

Aside from those purely commercial objects which form the mainspring of every business undertaking, the publishers of THE MANUFACTURER AND BUILDER seek to promote the *diffusion of useful, practical knowledge*, and to furnish to those engaged in the industrial arts a journal which will enable them to keep abreast of the wonderful developments which in these modern times result from the application of science to the arts. Without being trammelled by any special classification, or confined in its scope by the narrow limits of any particular trades or professions, they would offer the following synopsis as presenting a few of the prominent topics which have been discussed in its pages.

ARCHITECTURE.

This subject has been treated both as one of the fine arts and as a means of providing shelter for man and his works. Every improvement connected with the art of building, whether that improvement relates to beautifying the appearance, increasing the value, strength, and durability, or lessening the cost of erection, finds a legitimate place in its pages.

THE MOTORS,

Amongst the great agents in the improvement of the arts, none are more important than the Motors—steam, water, and wind. These, in all their various modifications, will receive full attention, and every improvement will be carefully noted and discussed.

SCIENCE APPLIED TO THE ARTS,

Is for example, the application of modern chemical discoveries to dyeing, of electricity to various processes, of magnetism to the examination of iron, have all received attention at the hands of the editors.

THE HOME DEPARTMENT

Is devoted to matters of immediate interest to the domestic circle, whether that matter be of practical or merely general interest. In short, everything of interest to our American homes may here be legitimately discussed.

ILLUSTRATIONS.

In connection with these varied subjects, the journal, during the first six months, contained upwards of 150 illustrations, some of which were of a degree of artistic excellence rarely seen in purely technological journals.

FORM AND SIZE.

Each number of THE MANUFACTURER AND BUILDER comprises 32 large quarto pages, cut, stitched, and bound within an engraved cover. At the close of every year subscribers have a book, when bound, of

384 Pages, with upwards of 300 Engravings.

In presenting to the public the peculiar features of THE MANUFACTURER AND BUILDER, we have preferred to speak in the past tense. We have referred to what we have done as an earnest of what we hope to accomplish in the future. One object that we have kept steadily in view is the increase of our circulation, so that, as an

Advertising Medium,

THE MANUFACTRUER AND BUILDER may ultimately rival any journal in the country. We have sought to effect this by placing the subscription price at the extremely low figure of

One Dollar and a Half per Year,

with liberal discounts to those who may get up clubs

The advertising rate is $3.75 for one-half inch space per month, or 75 cents per line each insertion. Special contracts made for long periods.

A specimen copy of THE MANUFACTURER AND BUILDER will be sent free to parties contemplating advertising or getting up clubs.

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MANUFACTORY: COOPER AVENUE,
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Send for Illustrated Circular and Price List.

AGENTS—ROBERT FOULDS, John street,
A. WEIDMANN & Co., 248 Grand street.

T. J. Scharfenberg. **J. N. Brewster.**
June 7:4t

NOTICE.

The DELERY GOLD MINING COMPANY, Proprietors of the Mining Rights in the Seigniory of Rigaud Vaudreuil in the county of Beauce, in the Province of Quebec, are prepared to issue free licenses to prospect and mine upon their property from the present date to the 1st of May, 1871. Particulars of conditions may be obtained at the Company's office, 46 St. Peter street, Quebec, or from W. P. LOCKWOOD, ESQ., at the Mines.

A. HECTOR, Secretary.
QUEBEC, June 2, 1870. June 14:2t

SAMUEL BONNELL, JR., OFFERS FOR SALE his SUGAR CREEK and HONEY BROOK

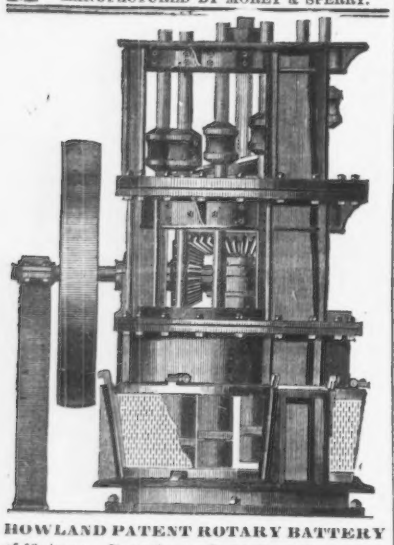
LEHIGH COALS,

OFFICE:
43 and 45 TRINITY BUILDING, 111 BROADWAY,
NEW YORK. Jan1:y

FILE-COVERS. FILE-COVERS. For preserving the numbers of the ENGINEERING AND MINING JOURNAL. Price $1.50. For sale by
WESTERN & CO., 37 Park Row, New York.

MINING MACHINERY, ETC.

MINING MACHINERY OF ALL KINDS.
MANUFACTURED BY MOREY & SPERRY.



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of 12 stamps. It requires no frame to put it up. Guaranteed to crush 2½ to 3 tons per day to the stamp. The best Battery ever used for amalgamating gold, or crushing silver ores, dry or wet. Can be put up on a mine in running order for one-half the price of the straight battery, and in three days after its arrival at the mine. 12-stamp battery, 20,000 pounds, with frame complete, price $3.000; 6-stamp battery, 8,000 pounds, price $1,300. Every mill run at shop before shipping.

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All the various styles of Pans, Amalgamators, Separators, Settlers, Concentrators, Dry or Wet, for working Gold, Silver or Copper Ores, the same as built in California and at lower prices. SHOES AND DIES made of the best white iron. Send sizes and we will make patterns and forward Shoes and Dies at low prices. Engines, Boilers and fixtures, and other Machinery made to order. Also, Howland's Patent Rotary Valve Double or Single Engines.

Irons for the best California 10-stamp mill, straight battery, complete, $1,600. Irons for low mortar, old style mill, much less.

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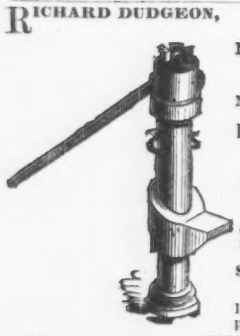

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Maker and Patentee of
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Punches,
Roller Tube Expanders, and Direct Acting
Steam Hammers.

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Degrees conferred in the different departments.

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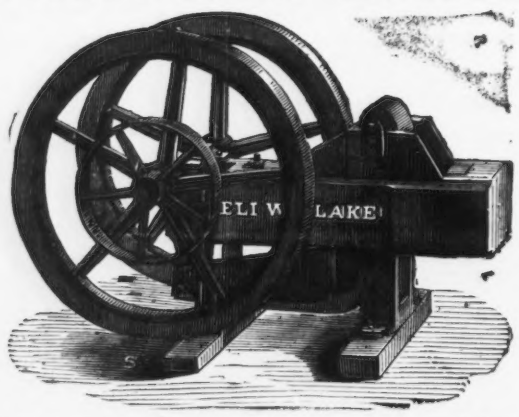
SCHOOL OF METALLURGY.—A COURSE of ten practical working lessons of two hours each, either in Chemistry, Metallurgy, or the art of Assaying, including Instruction, use of laboratory, machinery, fuel and apparatus, with all chemicals furnished to pupils. Working tests of eight pounds of ore, including crushing, grinding, roasting, amalgamating and retorting, with final assays to give the value of ores. Full analyses of minerals or assays of ores of any kind made by either dry or humid process. Consultations on any branch of Chemistry or Metallurgy. For terms, which are moderate, apply to EDWARD N. KENT,
Practical Chemist and Metallurgist,
May 30-4t 237 West 14th street, New York.

MINING MACHINERY.

BLAKE'S STONE BREAKER.



The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

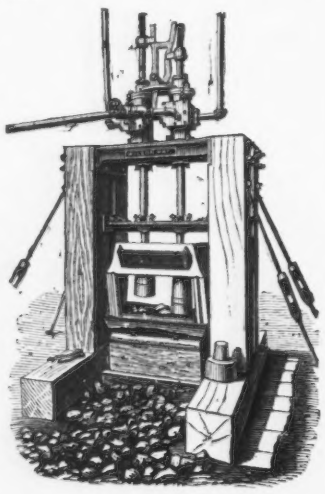
Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter to the undersigned.

☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

Mch. 14-1y. **BLAKE BROTHERS, New Haven, Conn.**

THE WILSON PATENT
Steam Stamp-Mill Company,
OF PHILADELPHIA, PA.

Are now prepared to supply Miners and other parties with their



New Steam Stamp-Mills
AT THE SHORTEST NOTICE.

These Mills have now been in operation for upwards of a year, and have proved to be the most durable and efficient, as well as the lightest for transportation, of any mills now used. The valve gear is of the simplest and most durable construction, readily adjustable by movable cams on the piston rods or stamp stems, thereby giving the operator absolute control of the length and velocity of motion and force of the blow. These Mills are adapted for both dry and wet crushing, and for the hardest rock or softest cement. These Mills are every way equivalent to a Twenty Stamp Mill. For further particulars call on or address

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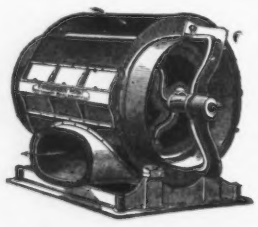

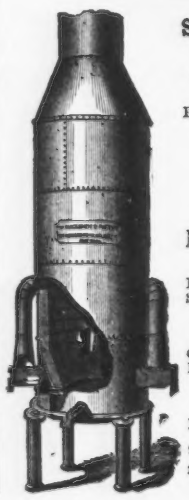

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Mar26-1y

ALBERT BRIDGES,
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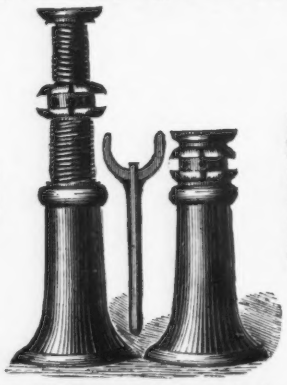

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KROM'S DRY ORE CONCENTRATOR.

Concentration by means of Air

has long been attempted, but hitherto without satisfactory results. **S. R. Krom** has invented and patented machines which concentrate the various ores more perfectly than can be done by any other means.

The *MECHANICAL COMBINATIONS* are extremely simple, the machines therefore correspondingly durable. A continuous self-delivery of ore on one side and tailings on the other is effected, hence very little attention is required except keeping the hopper supplied with ore. The power of one man is sufficient to operate a machine that will concentrate one ton per hour.

PARTIES INTERESTED IN MINING are invited to call at No. 210 Eldridge Street, New York, where they may see a machine in operation, and have samples of their own ores crushed and concentrated.

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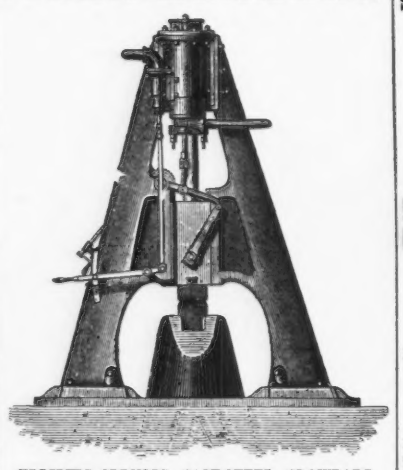

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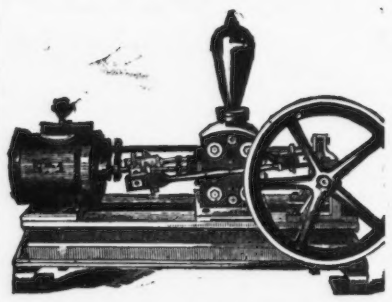

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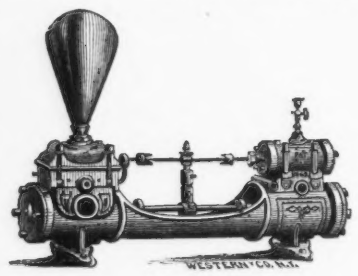

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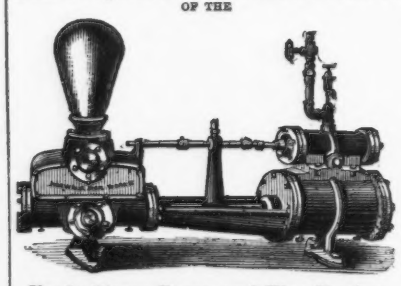

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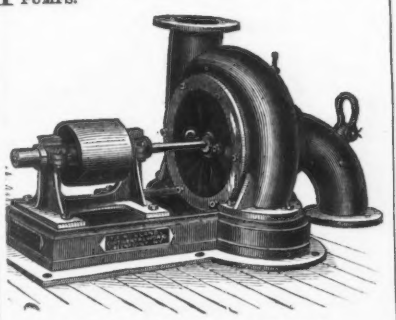

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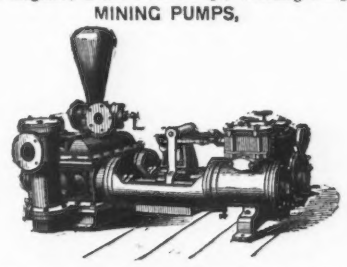

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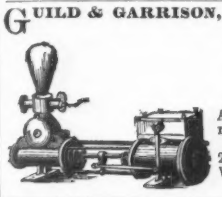

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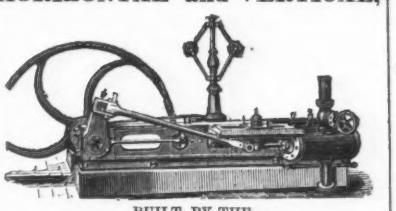

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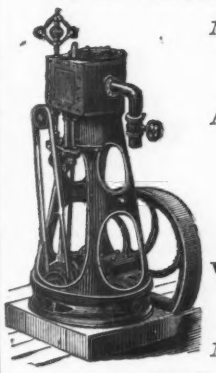

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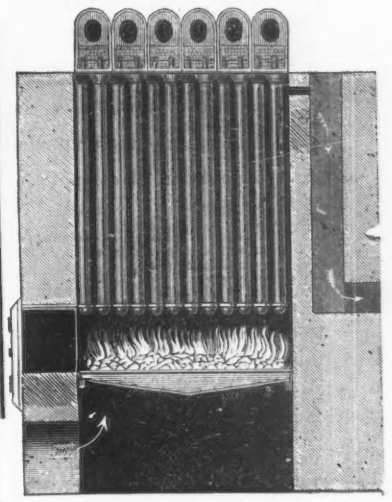

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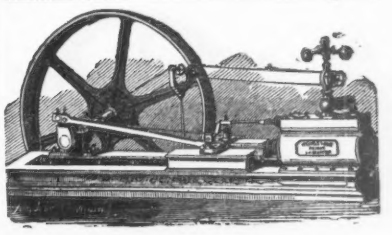

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" One current of (plans)
" One current of, and how to adopt separate currents (plan)
" Dividing of, but not into "separate and and distinct" current (plans)
" Crossings (see H on plans)
" Weight of in shafts
" How to find the weight of
" Table of pressure in shafts
" Expansion of
" Its velocity and force
" Rush of, into each division
" Quantity produced by natural ventilation
" Splitting, why it should be adopted
" Splitting, why the workmen object to Mr. Hopton adopting the mode
Anemometer, measurement of air by, engraving of
Area of a pit, how to find
Barometers, Showing the time of an outlet of gas in mines (engraving)
Bricks, how to find the number in the walling of a shaft
Buddle's plan
Circumference of a pit, how to find
Coal, several ways of working it out, and why man methods of working it out are adopted
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" Working it out in following up banks (plan)
" Working out in pillars (plans)
" Working out in long wall (plans)
" Working out in drifts (plans)
" Working out with no regularity (plan)
" Working out by the "end way" or in endings (plan)
Cubical Contents of a pit, how to find
Dialing, the mode of
Dials, several engravings
" How constructed
" How fixed in mine surveying
" Needle, its variations
Diameter of shaft
Dip of mine, how to find and lay on (plan)
Explosion, the power of an
" At Lund-hill, in what part of the mine it was supposed to take place (plan)
" How the power may be diminished
Furnace, how to find the horse-power of
" The place of fixing, to produce the largest ventilating current
" Engravings of ground floor, front and back view
" Remarks upon
Gases, (carbonic acid) composition of
" Do. properties of
" (After, or choke damp) composition of
" (Carburetted hydrogen) do.
" Choke damp and carbonic acid, not one and the same in quality
" The effect produced on people by inhaling such
" The quantity required for an explosive mixture
" The elasticity of
" The weight of
" The nature and quality of
" Why some mines generate and produce more than others
" Why some mines generate a mixture of
Goaf, or gob, how tramrods are made through (plan
Lund-hill (plan)
Managers, who are best competent to manage mines
Miscellaneous questions
Natural ventilation
Planning, how workings are laid on the plan
Regulations (see R on plans)
Safety Lamps, why flame will not penetrate through, engraving of
Sections on mechanical ventilation
Summary of accidents
Surveying, how mines are with the dial
Surveying, how mines are with the theodolite
Tables of weights and measures
Temperature on surface
Temperature in mines
Temperature, difference of between down and up-cast
Theodolites for mine surveying
Theodolites, how constructed
Theodolites, the magnetic needle dispensed with, and how workings are laid on plan, with Theodolite surveying
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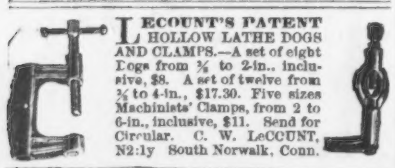

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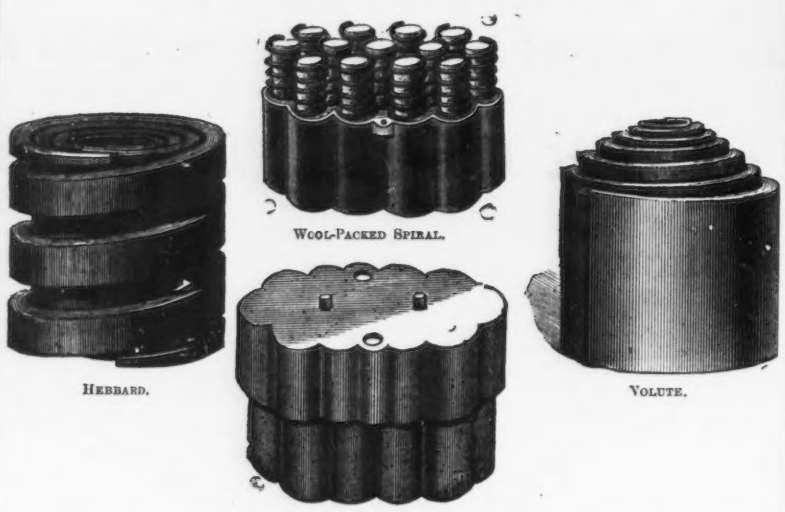

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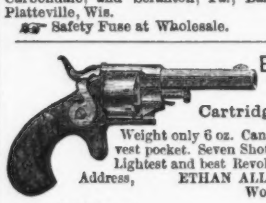

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